Development Concept Plan

March 1993

Lake / Bridge Bay
YELLOWSTONE
National Park • Idaho / Montana / Wyoming

United States Department of the Interior • National Park Service • Denver Service Center

SUMMARY

Lake and Bridge Bay are major developed areas within Yellowstone National Park and provide services to many of the visitors who come to the park each year. Lake was developed as a visitor use area more than 100 years ago, while Bridge Bay was developed in the 1950s and 1960s. Over the years roads in the area have been realigned, and various facilities and functions have been merged or separated, often with no clear distinction between visitor use and administrative areas. This has resulted in confusion for visitors and a situation where neither Lake nor Bridge Bay functions as efficiently or as effectively as it could. Additionally, as visitation has grown in recent years, the facilities and housing needed to provide the maintenance, visitor protection, resources management, interpretive, concessioner, and medical services to the public have not kept pace. Many employees live in deteriorated, uninsulated structures moved in years ago as "temporary" housing. The *Lake / Bridge Bay Development Concept Plan* has been prepared to address these issues, as well as to implement portions of the 1988 *Final Environmental Impact Statement / Development Concept Plan* for Fishing Bridge. That approved plan, in an attempt to protect critical habitat and reduce conflicts between humans and grizzly bears, directed the relocation of National Park Service (NPS) employee housing and the service station/auto repair facility from Fishing Bridge to Lake.

A development concept plan is the National Park Service's long-term planning document that examines visitor use of an area — from visitor needs and how the various facilities integrate with each other and serve visitors to the relationship of facilities and the environment. Development concept plans often provide the details that implement or change a much broader, parkwide plan. In the case of Yellowstone, the 1974 *Master Plan* sets the overall direction for the park by capping overnight use, consolidating developments, and returning many areas to day use only.

At Lake and Bridge Bay no new visitor use developments are proposed in this *Development Concept Plan,* except the potential fish hatchery museum (which would be in an existing building). All other visitor facilities proposed in the plan will replace existing structures that are no longer serviceable. Administrative support facilities and employee housing proposed in the plan will, for the most part, replace existing substandard facilities. Any additional administrative facilities and housing proposed are an attempt to reasonably project future needs and where those facilities and functions could best be located.

In accordance with the 1988 *Final Environmental Impact Statement / Development Concept Plan* for Fishing Bridge, the Lake / Bridge Bay *Development Concept Plan* will relocate the service station/auto repair facility and housing from Fishing Bridge to Lake. In addition, vehicle circulation routes will be redesigned to alleviate visitor confusion, interpretive opportunities will be provided, and visitor use areas will be clearly defined and separated from administrative, maintenance, and staff residential areas. At Bridge Bay the campground will be rehabilitated, circulation routes improved, and marina facilities upgraded.

This document has been prepared in compliance with the requirements of the National Environmental Policy Act, section 7 of the Endangered Species Act, and the National Historic Preservation Act. Formal consultation with the U.S. Fish and Wildlife Service was conducted, and that agency's biological opinion of this plan is included in appendix F. Consultation has also taken place with the Wyoming State Historic Preservation Office.

The implementation of the plan will result in no adverse effects to the bald eagle *(Haliaeetus leucocephalus)*, peregrine falcon *(Falco peregrinus)*, or whooping crane *(Grus americana)*. The plan is not likely to jeopardize the continued existence of the grizzly bear *(Ursus arctos horribilis)* because of the various management actions proposed by the National Park Service. Some of those short-term actions include not opening the Lake Lodge and cabins until June 10 annually and keeping approximately 25% of the cabins — those nearest Lodge Creek — closed until fish spawning and associated bear activity ceases; establishing a physical barrier (such as a split-rail fence) between the Lake Lodge cabins and Lodge Creek; and closing loops G, H, and I in the Bridge Bay campground until fish spawning and associated bear activity ceases. On a long-term basis the Park Service will rehabilitate the Otter Creek administrative area and the Little Thumb Creek service road and former gravel quarry to their natural conditions.

The draft *Development Concept Plan / Environmental Assessment* was made available for public review from February 3 through April 3, 1992. A total of 70 responses were received, including comments from the Greater Yellowstone Coalition, the Wilderness Society, the Cody Chamber of Commerce, Wyoming Game and Fish, the Wyoming State Historic Preservation Office, the Advisory Council on Historic Preservation, Yellowstone Park Service Stations, and 55 individuals. Major concerns included the opening dates for Lake facilities, the funding source(s) for proposed mitigating measures, and the need to finish mitigations agreed to in the Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan.*

As a result of public comments and the biological opinion from the U.S. Fish and Wildlife Service, the following changes have been incorporated in the plan:

> The proposed fish hatchery museum will be analyzed in a separate environmental assessment prepared by the U.S. Fish and Wildlife Service.
>
> Language with regard to the Natural Bridge hiking/biking trail has been clarified.
>
> Trails and relocated road segments have been more accurately located on maps.
>
> Wetland habitat has been delineated in a concessioner housing area and the area to be developed has been modified to avoid any impact on that wetland habitat.
>
> Only management actions that the Park Service reasonably believes can be funded and accomplished are included in the final plan.
>
> The status of Fishing Bridge mitigations are detailed.
>
> A cumulative effects section has been added.
>
> No action will be taken that could affect cultural resources until survey work has been completed and evaluated.

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PURPOSE OF AND NEED FOR THE PLAN

Lake Hotel

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INTRODUCTION

Yellowstone National Park is a major destination for tourists from throughout the United States and the world. More than 3 million people visit the park annually, and approximately half go to Lake and Bridge Bay where there are overnight accommodations and facilities for boating on Yellowstone Lake. Lake and Bridge Bay are on the northwest shore of Yellowstone Lake; Lake is approximately 2 miles southwest of Fishing Bridge, and Bridge Bay is approximately 2 miles southwest of Lake. The developments are about 21 miles northwest of Grant Village/West Thumb, 16 miles south of Canyon Village, and 27 miles from the east entrance (see Park/Region map). Vegetation in this area is predominantly lodgepole pine.

Major highways within the park that provide access to the northern Yellowstone Lake area are US 20/191/287 from the west entrance, US 89 from the north entrance, US 212 from the northeast entrance, US 14/16/20 from the east entrance, and US 89/191/287 from the south entrance. All main highways within the park intersect the Grand Loop Road, which provides access to the Lake and Bridge Bay developed areas.

The Lake developed area includes facilities for visitors, NPS administration and operations, and park concessioners. Visitor facilities range from overnight accommodations at the Lake Hotel and Lake Lodge cabins to a general store and a post office. Facilities for administration and operations include a ranger station, office buildings, two boathouses, maintenance facilities, and employee residences. Other support development includes a small hospital, a U.S. Fish and Wildlife Service (USFWS) administrative complex, concessioner housing, parking areas, access roads, and remnants of the Grand Loop Road along the lakeshore. The USFWS complex was built in the early 1930s and is also used for housing and storage.

Facilities and services in the Lake area have been developed and modified over time. As a result, they do not function as an integrated, efficient NPS visitor use area. Visitors often have a difficult time finding services, there is frequently no clear separation of visitor and administrative functions, and conflicts between pedestrians and vehicles occur along the lakeshore. In addition, little NPS orientation or interpretation is provided about resources or services and facilities.

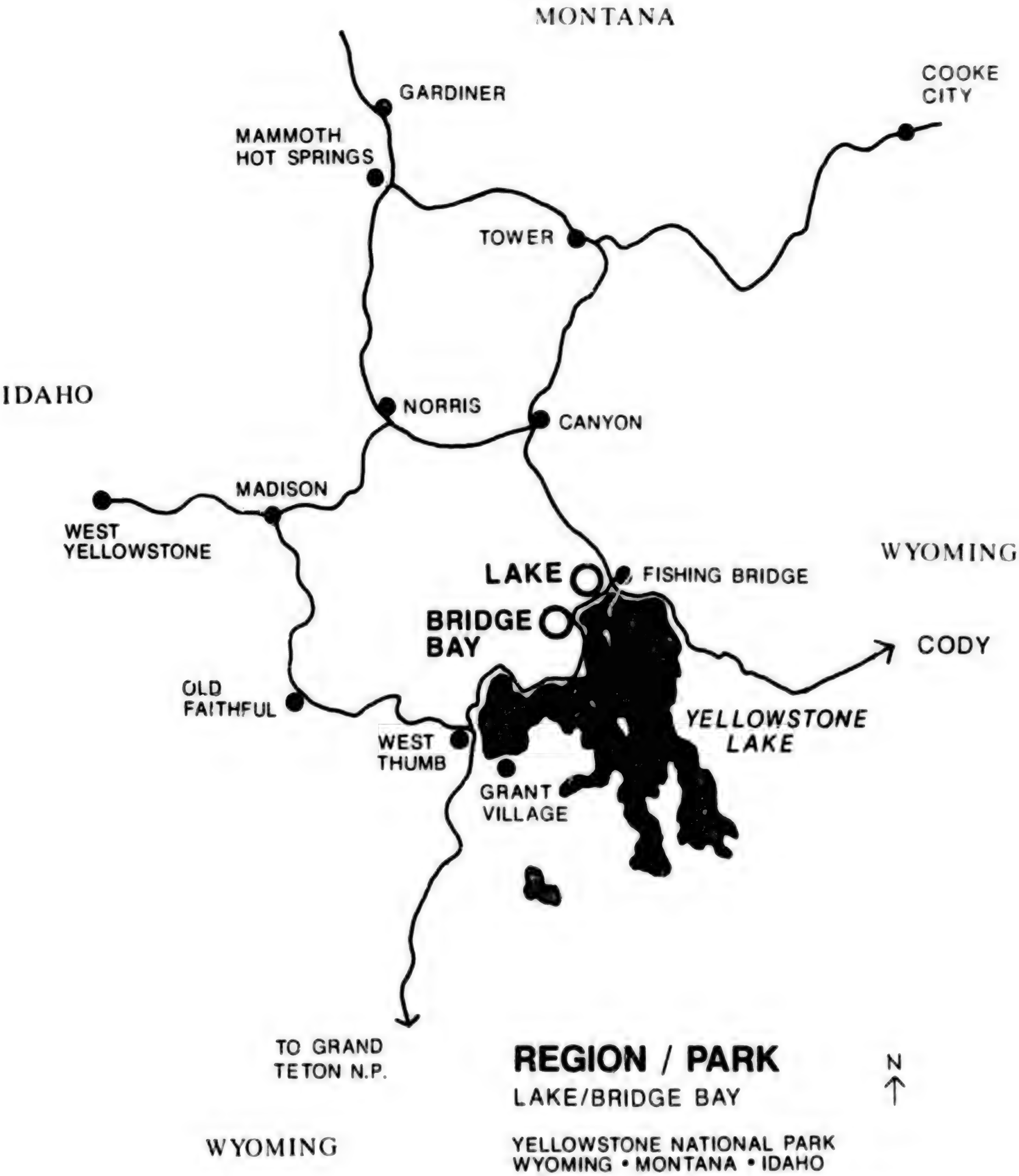
The development at Bridge Bay was built in the 1950s and 1960s to upgrade aspects of the visitor experience while ensuring the protection of fragile resources. This development includes boat rental and tour boat facilities, other marina operations, a ranger station, a boat repair shop, a concessioner-operated store, a 420-site campground, amphitheater, and campground ranger station. Heavy use of the area has resulted in congestion and crowded conditions in both the marina and campground.

The Natural Bridge area is near Bridge Bay and provides a limited visitor experience, with an interpretive exhibit and nondesignated social trails. There has been considerable erosion along the trails.

In 1988 the National Park Service prepared a *Final Environmental Impact Statement / Development Concept Plan* for the Fishing Bridge developed area. That proposed development concept plan has ramifications for the Lake area. The 1974 *Master Plan* for Yellowstone National Park identified the Fishing Bridge developed area as a critical wildlife habitat and proposed the eventual phasing out of accommodations and support facilities to permit the restoration of more natural ecological conditions. This proposal received added impetus when the grizzly bear was listed as threatened under the Endangered Species Act in 1975. The Fishing Bridge area was identified as a primary source of conflict between humans and grizzlies, and there were unacceptably high numbers of bear deaths in the area. Thus, in 1983 a development concept plan was initiated for the Fishing Bridge area, which led to the 1988 final plan. Part of the plan directed that the service station/auto repair facility be moved from Fishing Bridge to Lake. Additionally, all NPS and concessioner housing was to be relocated to the Lake area.

The purpose of this plan is to protect resources, to offer a quality visitor experience, and to provide for efficient administration and operations.

Documents relevant to this planning effort include the 1974 *Master Plan* for Yellowstone National Park, which establishes guidelines for overall use, preservation, management, and development of the park; the 1986 *Interpretive Prospectus*, which outlines interpretive media and themes; the 1987 *Environmental Assessment, Access and Circulation Improvements, Lake Hotel*; and the 1988 *Final Environmental Impact Statement / Development Concept Plan* for Fishing Bridge.



REGION / PARK

LAKE/BRIDGE BAY

YELLOWSTONE NATIONAL PARK
WYOMING • MONTANA • IDAHO

UNITED STATES DEPARTMENT OF THE INTERIOR/
NATIONAL PARK SERVICE

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PROBLEMS AND ISSUES

LAKE

Commercial services at Lake date back to the early days of the park. The Lake area provides 22% of all overnight accommodations in the park. Lodging is available at the Lake Hotel (194 rooms) and cabins (102 units) and the Lake Lodge cabins (186 units). Food service is available at the hotel in the dining room (210 seats) and a delicatessen (30 seats), and at the lodge in a cafeteria (179 seats); the lodge also has a bar (8 to 10 seats). The hotel has a gift shop and beauty shop, and the lodge a gift shop and laundry facilities. These facilities are owned by the National Park Service and operated by TW Recreational Services (TWRS) under a concession contract effective through October 31, 2001.

A general store sells souvenirs, apparel, fishing and camping supplies, film, and groceries; it also has a 25-seat soda fountain. The store is operated by Hamilton Stores, Inc., (HSI) under a concession contract that is effective through September 30, 1999.

The Lake hospital has 10 in-patient beds, emergency facilities, a pharmacy, and an emergency/ambulance entrance. There is a temporary helipad nearby. The hospital is owned by the National Park Service and operated by Yellowstone Park Medical Services (YPMS) under a concession contract that expired October 31, 1992. A new contract is being negotiated.

The original alignment of the Grand Loop Road took visitors along the Yellowstone Lake shoreline to the front of the Lake Hotel, and facilities and services were designed to take advantage of this access pattern. In 1971 the road was rerouted around the Lake developed area to eliminate hazardous intersections, relieve congestion, and reduce numerous roadside conflicts for visitors. The new circulation system created additional problems, however, because visitors were brought into the Lake area from the back, through a forested area and past several service road intersections. A spur access road was constructed to allow visitors to see the front of the historic Lake Hotel, but the main entrance for registering guests was moved to rear. To reduce the visual intrusion of vehicles on the natural setting of the lake, the road along the northwest shoreline was abandoned (see Lake — Existing Conditions map).

As a result of these changes and a predominance of dead-end roads, visitors to Lake are often confused by the clutter of nonvisitor facilities and are frustrated by a lack of direct access to Yellowstone Lake. Furthermore, there is no major visitor contact facility to provide information, to help visitors find services and facilities, or to explain the area's cultural and natural resources. The overall visitor experience does not take advantage of the spectacular Yellowstone Lake views, is historically inaccurate, and is inconsistent with park management objectives to provide a quality visitor experience.

The visitor circulation problems at the Lake Hotel were addressed in the 1987 *Environmental Assessment, Access and Circulation Improvements* for the Lake Hotel, and construction has been programmed to correct a majority of these problems. Arriving visitors will be routed to the front of the hotel for registration and orientation, and the rear of the hotel will be used as a secondary visitor drop off and for access from the parking area.

Problems that are addressed by this plan include the following:

Circulation/roads/parking/trails: Flow-through traffic was eliminated when the road was rerouted and replaced by a system of dead-end roads, creating numerous intersections where visitors must decide which way to go. The resulting traffic pattern makes many facilities hard to find and get to. For example, vehicle access to the lakefront, the general store, and the ranger station is by way of poorly designed and inadequately signed connector roads from the main road.

Vehicular circulation problems in the Lake area are compounded by a limited pedestrian trail system. There are some trails, but the trails connecting Lake to Bridge Bay and to Fishing Bridge are poorly defined social trails. The haphazard network of social trails and the lack of formalized or designated trails causes dispersed visitor use patterns. Visitors and employees have little choice but to rely on their cars to get around.

Shoreline erosion: Wave action and possible sheet wash have caused considerable erosion along the shoreline of Yellowstone Lake. There are also a number of culverts and pipes that carry heavy runoff, which further accelerates bank erosion. Visitors have contributed to this problem by using these erosion channels to gain access to the shore.

Interpretation: Very little interpretation about the area's natural and cultural resources is provided for day or overnight visitors. There is an exhibit on bears at the Lake ranger station. Overnight visitors who want to take part in interpretive activities must go to Bridge Bay or Fishing Bridge to attend evening programs. The 1986 *Interpretive Prospectus* recommends constructing a visitor center north of the Lake area, off the Grand Loop Road. This location was considered but not further evaluated. Although it would provide scenic views of the lake and mountains, visitor use in this area would encroach on grizzly bear habitat. Also, this location would not be readily accessible for overnight visitors at Lake.

Lodging: Both the hotel and the lodge have been recently renovated. However, the visitor cabins at the hotel and lodge need repairs. There is little space between cabins, space for guest vehicles as well as fire vehicle circulation is inadequate, and the area is not landscaped, resulting in a poor visitor experience. The Lake Lodge cabins are very close to Lodge Creek, an area used by grizzly bears during the spawning season.

Food service: Food service in the area is available only in the summer, and it can be time consuming to obtain, particularly for visitors seeking a fast-food service. Most day visitors wanting lunch must dine at either the Lake Hotel restaurant or the Lake Lodge cafeteria, both of which generally have long waiting lines. Limited food service is available at the general store.

Hospital Area: At the hospital area the emergency helipad is a temporary facility, and the location of the incinerator poses safety problems for helicopter landings during inclement weather. The helipad is also used as a volleyball court.

Service station/auto repair facility: Because Lake is a relatively remote area, a service station/auto repair facility is needed to provide basic visitor support services (the nearest auto repair facilities outside the park are more than 80 miles from Lake). The Lake service station was taken out of service at the end of the 1989 season because of its poor location, lack of repair facilities, and the age of the fuel tanks. The only other service station/auto repair facility in the area is at Fishing Bridge; the 1988 Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan* calls for that facility to be relocated to the Lake area.

Resource management: Grizzly bears are and will continue to be attracted to riparian areas and spawning streams in the Lake/Bridge Bay areas, posing the potential for bear/human conflicts.

Rehabilitation/restoration: There is no comprehensive restoration/rehabilitation plan for previously disturbed visitor use and administrative facilities within the Lake/Bridge Bay area.

Fish hatchery complex: The Fish Hatchery Historic District was listed on the National Register of Historic Places in 1985. The fish hatchery building is no longer operational, and the two nearby boathouses are dilapidated and used primarily for winter season storage of boats and other equipment. Other structures are used for fisheries management programs, administrative activities, storage, and housing. The number of researchers has increased over the past several years, but office space and housing for staff and visiting researchers are inadequate.

Fire prevention: There is no fire station within the visitor use area at Lake, and fire trucks are housed at the housing/maintenance complex; this area is crowded, and the existing facility is inadequate. The 1988 Yellowstone fire did not affect the immediate area; however, in the event of a fire at Lake, access for firefighting equipment would be indirect and troublesome because of the road circulation situation.

NPS and concessioner employee housing and recreation: Park housing for concessioner and NPS employees is insufficient for both seasonal and essential year-round staff. The housing areas are cramped, and many structures are substandard. In addition, the 1988 Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan* calls for moving all NPS and concessioner housing from Fishing Bridge to Lake. There is no existing housing that can be used for relocated employees. As funding has become available, units have been relocated. At this time some concession and NPS employees must still be relocated. The area now used for trailers and recreation vehicles (RVs) has no room for expansion, although increasing numbers of concessioner employees are requesting RV spaces.

There is no community center or recreation area in this remote duty station for NPS employees to gather at. The concession employee recreation facility next to the Lake Lodge building is too small, and noise from this facility frequently annoys lodge guests and has resulted in complaints. Employee housing next to the lodge also causes visitor/employee conflicts and is visually intrusive.

Maintenance: The NPS maintenance area is in the northern part of the developed area, near the NPS housing area. The area consists of temporary carpentry, plumbing, and electrical shops. Storage space is lacking, and the equipment/vehicle repair shop and fire station are too small. There is no maintenance facility for the concessioner at Lake.

BRIDGE BAY

The Bridge Bay marina includes 119 rental slips, a boat repair and parts facility, boat trailer parking, and a fuel facility, all operated by TW Recreational Services. Guided boat trips and boat rentals are also offered. A marina and camping supply store is operated by Hamilton Stores. Facilities are owned by the National Park Service. An NPS ranger station is at the marina, next to the Hamilton store.

The Bridge Bay campground, which opens in late May and closes at the end of September, provides 420 campsites and an amphitheater for interpretive programs. Beginning in the summer of 1988, the campground was placed on a reservation system. Such a reservation system was suggested during the planning process for Fishing Bridge as a means of better utilizing existing campsites in Yellowstone National Park. Before the reservation system was implemented, Bridge Bay typically was the third campground in the park to fill (after the Norris and Madison campgrounds). Each year the public has become more aware of the campsite reservation system. In summer 1992 Bridge Bay was typically the first campground to fill, and more than 62% of the campers had made reservations.

There are difficulties at the Bridge Bay marina facilities and the campground in serving the large number of visitors to the area, resulting in long lines and crowded conditions in both locations.

Marina: The marina bulkhead is settling somewhat and shifting. The entrance to Bridge Bay is silting in, causing problems for boats entering and leaving the bay, particularly during dry periods when conditions may preclude all use.

The marina store is too small to accommodate both campground and marina users. Service vehicles park at the rear of the building, but they can be seen by visitors who must approach the store from the rear parking lot. Access for service vehicles is a narrow, dead-end road, so vehicles must back out when leaving, creating potential safety problems for pedestrians because of poor sight distances.

Campground: There is only one entrance lane to the campground. This causes confusion and congestion at the campground entrance road intersection when vehicles line up to register. Vehicles that are already registered often get caught in long lines when re-entering the campground.

The campground registration building is a small structure that does not have enough space to service the large number of campers coming to the area or to house the computer equipment associated with automated, advance registration.

There are no shower or laundry facilities to serve campground and marina users.

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Sites at the campground are not level, and tent pads are too small; circulation routes are poor; and vegetation has been trampled or removed, providing little site separation. There are recurring problems with bison using areas of the campground, which poses safety problems for visitors.

The small ranger station/residence must be used for both living quarters and visitor functions (information and orientation, backcountry permit distribution). Because it is in a visible and easily accessible location, NPS employees are seldom able to go off duty.

The back loops of the Bridge Bay campground are within sight and sound of the Bridge Bay transfer station, a maintenance facility, and storage area. Noise from administrative activities in the area disturbs campers, and the site is visually unappealing for campers staying in the nearest sites.

Resource management: Grizzly bears are and will continue to be attracted to the Bridge Bay area, particularly during the cutthroat trout spawning season. This will continue to pose a potential for conflicts between bears and humans.

Natural Bridge: The visitor experience at Natural Bridge is marred by erosion, lack of trails, and outdated and deteriorated exhibits. There is trail access to Natural Bridge from the Bridge Bay marina parking lot. The existing road to Natural Bridge from the Grand Loop Road is currently used for administrative purposes only and as a hiking/ biking trail. The dredge spoil piles from Bridge Bay are stored near the road, further intruding on the natural scene.

MANAGEMENT OBJECTIVES

The following objectives were developed as the basis for preparing and analyzing alternatives for the Lake and Bridge Bay developed areas:

- Allow visitors to experience the natural and cultural resources in the area while ensuring the protection and preservation of those resources.
- Physically separate visitor services from administrative use areas, and eliminate the clutter of nonvisitor facilities.
- Consolidate all housing and office facilities, and accommodate future needs by allowing some growth within the physical and resource limits of the administrative site.
- Improve visitor orientation to and interpretation of the area.
- Provide opportunities for a variety of visitor activities, including interpretive and recreational functions.
- Provide opportunities to encourage pedestrian and bicycle circulation.
- Maintain and enhance views of the prime natural resource — Yellowstone Lake.
- Improve visitor vehicle circulation and safety.
- Reduce crowded employee housing conditions, and improve the quality of community services for all employees.
- To prevent any further displacement of grizzly bears, locate as much of the proposed additional development as possible within zones of influence attributable to existing developed areas.
- Alleviate long-term conflicts between bears and humans.
- Rehabilitate previously disturbed areas to their natural condition and habitat quality.
- Maintain water quality in Bridge Bay marina and mitigate any deterioration.

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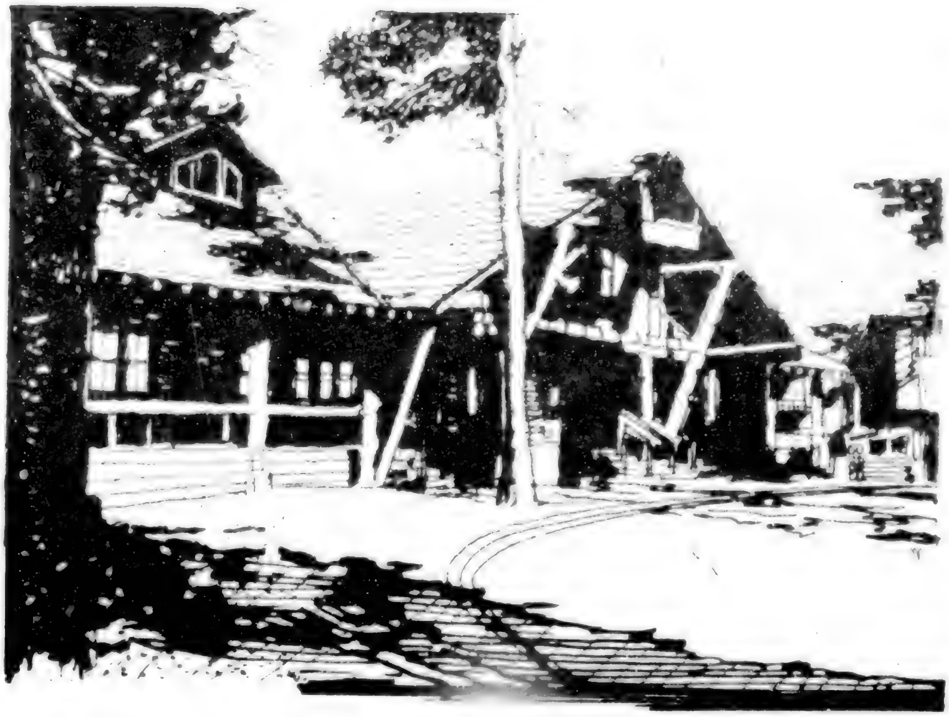

Lake Lodge

LAKE DEVELOPMENT CONCEPT PLAN

The goal of the development concept plan is to redesign the Lake developed area so that it will better function as an integrated visitor use area. Visitor confusion resulting from the present road system will be alleviated, visitors will have opportunities to walk on paths along the lakeshore, and interpretive services will be provided to enhance the visitor experience. Visitor use areas will be clearly defined and separated from administrative, maintenance, and staff residential areas. Actions in the Lake developed area that were proposed and approved in the Fishing Bridge 1988 *Final Environmental Impact Statement / Development Concept Plan* will be accomplished. NPS and concession employee housing needs will be met. An overriding objective of the plan is to provide visitor facilities and services in such a way as to minimize encounters between bears and humans. To this end, a number of specific management actions will be implemented as part of this plan to reduce or eliminate impacts of the plan on grizzly bears (see page 30). Cost estimates for implementing the plan are included in appendix B.

ACCESS AND CIRCULATION

Current access to the Lake developed area from the Grand Loop Road will be retained. To improve access throughout the developed area, the main entrance road will first lead visitors past a service station and vehicle repair facility. A clearly marked loop road will then lead directly to the front of the Lake Hotel and along the lakeshore, providing access to the fish hatchery museum complex to the west of the hotel (if the museum is built) and to the general store and ranger station to the east (see the Lake — Development Concept Plan map). Access to the Lake Lodge would be at a clearly marked T-intersection north of the ranger station. The lodge road will end in a vehicle turnaround.

The lakeshore road in front of the general store will be redesigned. and a separate pedestrian trail will be provided along the roadway. The lakeshore road will be relocated away from the shoreline at the ranger station. These changes will allow visitors to drive or stroll safely along the lakeshore. Shoreline erosion will be monitored, and any necessary corrective action will be taken.

Current access to the hospital and the USFWS administrative area will be retained, but the intersection on the entrance road will be improved and clearly marked. Circulation in the hotel cabin area will be redesigned as a loop to eliminate existing dead-end roads and to facilitate emergency access.

A portion of the original lakeshore road alignment will be used as a seasonal hiking/biking trail to link the Lake and Bridge Bay areas. The trail will extend from the intersection of this abandoned roadway with the Grand Loop Road (near Bridge Bay) and follow the Grand Loop Road to the to the Natural Bridge hiking/biking trail. The old road alignment and social trail from the ranger station to Fishing Bridge will be rehabilitated for use as a hiking trail. Neither trail will be open before the end of the fish-spawning season and associated bear use.

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INFORMATION/ORIENTATION/INTERPRETATION

As presented in the 1986 *Interpretive Prospectus*, interpretation will focus on Yellowstone National Park as the core of the largest intact ecosystem in the temperate zone of the earth. Its unique volcanic origin created a vast stage where the interaction and interdependence of the park's landforms, climate, soils, thermal waters, natural fires, and organisms can be contemplated — from heat-loving bacteria and algae to fish, elk, grizzly bears, and people.

Informal interpretive programs will continue to be provided at the historic ranger station. Boating and backcountry permits will also be issued there.

It has been proposed that at the Fish Hatchery Historic District a "living history" exhibit be created to interpret the park's historic role in fisheries management. However, before any development of this facility, the U.S. Fish and Wildlife Service will prepare a separate environmental assessment of the project. If built, this interpretive area would not open before July 1. Exhibits would include the display of live native fish, a discussion of the interrelationships of fish and other park wildlife, the tools of the fisheries profession, and the evolution of the fisheries management philosophy. The U.S. Fish and Wildlife Service would provide, install, and maintain aquariums, which would be stocked with wild trout that would be captured and then released at the season's end. That agency would also supply historical documents, artifacts such as equipment and clothing, and photographs to tell the story of fisheries management in Yellowstone. The U.S. Fish and Wildlife Service has arranged for the donation of one of their early boats and would transport it to Yellowstone for display in association with these exhibits. The interior of the west end of the fish hatchery museum would be designed for evening programs. Boathouse and hatchery restoration would primarily be a cooperative endeavor between the U.S. Fish and Wildlife Service and the National Park Service. If, following the USFWS environmental assessment of the project, the museum is not developed, then other compatible, adaptive uses for this building will be examined.

SERVICE STATION/AUTO REPAIR FACILITY AND POST OFFICE

The service station/auto repair facility and post office will be relocated to an already disturbed site near the entrance to the Lake developed area. The design of these buildings will be architecturally compatible with the historic structures in the Lake area. Parking will be provided for 20 cars and 3 RVs. Two new dormitories, one for employees of the service station and the other for employees of Hamilton Stores, will be constructed behind the service station.

FISH HATCHERY HISTORIC DISTRICT

Besides the potential new interpretive function planned for the fish hatchery building, the other structures in the Fish Hatchery Historic District will be retained for use by the U.S. Fish and Wildlife Service. These uses include offices, laboratory, housing, and storage. All buildings contributing to the historic district will be stabilized and rehabilitated to their historic appearance. The building now used by the National Park Service as its south district office will be returned to the U.S. Fish and Wildlife Service for its use. Trailers and other nonhistoric housing units will be removed, and replacement units will be provided in the NPS housing area. The two housing units nearest Hatchery Creek will be evaluated for retention, relocation, or removal based on evolving bear information. The existing parking area (10 cars) will be maintained for USFWS staff parking. The historic boathouse will be retained and rehabilitated while the other boathouse (which dates from the 1940s) will be removed.

LAKE HOSPITAL AREA

The hospital and parking areas will be retained. A permanent emergency helipad will be developed near the hospital. The existing nurses' dormitory will be converted to four housing units, and a new dormitory for nurses (20 rooms), which will be designed to be compatible with the Fish Hatchery Historic District, and parking (20 cars) will be constructed south of the new nurses' dormitory. The incinerator will be relocated from the temporary helipad area to a site next to the hospital.

A fire station for the Lake developed area will be constructed near the hospital. This will consolidate emergency services and provide easy access to all area facilities. The station will include a training room, two vehicle bays, rescue cache, storage space, and quarters for four employees.

LAKEFRONT DEVELOPMENTS

The general store will be retained at its present location. Public restroom facilities will be added, and bear-proof garbage storage facilities will be constructed. Parking will be provided for 40 cars, 6 RVs, and 3 buses.

The former Lake service station, which was closed in 1989, will be rehabilitated and adaptively used.

The ranger station will be retained for general information and the issuance of backcountry and boat permits. Parking for five visitor's cars besides staff parking will be provided. Additionally, the existing offices will be supplemented by converting the ranger station apartment into an office for subdistrict ranger personnel.

LODGING AND FOOD SERVICES

The present functions of both the Lake Hotel and Lodge, which have recently been restored to their historic appearance, will be continued. Visitors will be routed to the front of the hotel for registration. Long-term parking (250 cars/10 RVs) will continue to be at the rear of the hotel in a redesigned parking area. The hotel cabins will be retained until funds became available to consolidate them into motel-style buildings in a compatible architectural style. The room next to the boiler room behind the hotel will be rehabilitated and adaptively used.

To help alleviate conflicts between bears and humans, the Lake Lodge cabins will eventually be consolidated into motel-type buildings in a compatible architectural style and located approximately 100 yards from Lodge Creek. These larger, less numerous units will greatly reduce the total size of the cabin area. The road nearest Lodge Creek will be redesigned away from the creek at the time of consolidation. The larger of the two employee dormitories behind the lodge will be retained. The smaller dormitory and the employee pub will be removed. In their place a small maintenance building and an employee parking area (50 cars) will be constructed.

NPS ADMINISTRATION/MAINTENANCE/HOUSING AREA

The NPS administrative area will be redesigned to meet current and projected year-round requirements. Maintenance and storage facilities will be expanded once a concessioner's dormitory has been removed and new facilities constructed. Carpentry, electrical, and plumbing shop functions for the park's southern half are handled from Lake each summer. These shops are currently housed in temporary structures. Relocating the shops into larger, well-constructed facilities will allow the staffs to be more efficient and better able to respond to maintenance needs.

The NPS south district maintenance offices, currently housed in a USFWS building in the Fish Hatchery Historic District, will be relocated to this area. Parking will be provided for maintenance equipment. The current fire station in the administrative area will be enlarged or replaced to better serve the Lake area as well as to provide backup for the new Lake fire station.

Replacing temporary and substandard housing and constructing additional employee housing are important components of this plan. These actions are necessary to complete the removal of employee quarters from Fishing Bridge, in accordance with the recommendations of the Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan*. Housing for year-round NPS employees will be west of the existing housing. Seasonal quarters for the National Park Service and other agencies will be primarily in areas where RV pads and mobile homes now exist. Eventually the National Park Service intends to remove all mobile homes.

Because of the variability of the park's budget and changing demographics, a variety of housing types and sizes will be provided to meet the varying needs and numbers of year-round and seasonal employees. An additional 25 two- or three-bedroom units will be needed to accommodate year-round employees, and 6 existing units will be rehabilitated. An additional 58 efficiency, one- and two-bedroom units will be needed for seasonal employees, and 33 existing units will be rehabilitated. Seven sites for RVs will be provided for seasonal workers. Housing unit numbers are based on past and current staffing levels, as well as future projections. All units will be designed for energy efficiency and will meet life safety standards. The new units will be more spacious inside, have larger bedrooms, better furnishings, and more storage and work spaces. All units will be designed to take advantage of views, privacy, aesthetics, and solar gain. Housing areas will also meet the environmental requirements of living among threatened or endangered animal populations.

Related development will include an NPS community center, playground facilities, a picnic area, and a trail network. A designated foot trail will improve pedestrian access to the main Lake complex. The community center will include a community gathering room, day-care facilities, and other similar spaces.

CONCESSION HOUSING AREAS

Housing for concessioner employees will occur in two areas. The existing TWRS employee housing area will be redesigned to accommodate employees living in substandard and poorly located quarters at Lake Lodge. To accommodate these employees, plus those at Teal dormitory (20 rooms), a new 60-room dormitory will be constructed at the site of the Teal dorm. An existing cabin or similar-sized quarters will be located in this area to accommodate the hotel's winter maintenance person, and the structure now used for that purpose will be removed. RV sites in this area will be relocated to make room for employee parking (100 cars), and new RV sites will be provided near the NPS maintenance and housing area. Across Hotel Creek and behind the new service station, two dormitories (55 rooms total) will be constructed, one for HSI employees and one for Yellowstone Park Service Stations (YPSS) employees, along with parking for 85 cars. An employee pub and recreation area will be constructed near the center of the housing area. This facility will include indoor recreation space for basketball, movies, and other activities, besides the pub.

A second concession housing area will be next to and north of the NPS administrative area. Wetlands concerns in the area were addressed by detailed mapping of the vegetation and an examination of the soils, and the development boundary was adjusted to avoid sensitive areas. Up to 80 RV sites will be located here. Another area, which is already used for mobile homes, will be redeveloped to accommodate an additional 30 RV sites. For the long term the Park Service will analyze whether or not all RV sites should be phased out and replaced with permanent structures. Both developments will be designed, constructed, and managed by the concessioners, with NPS oversight and special emphasis on bear management measures.

UTILITIES

Utilities at Lake include water, wastewater, electrical, and telephone systems. The National Park Service provides potable water treatment, storage, and distribution, as well as wastewater collection, treatment, and disposal. Electricity and its primary distribution system are provided by the Montana Power Company; the National Park Service is responsible for secondary electrical power distribution. Telephone service is provided by US WEST Communications. In most instances existing utilities will be used for relocated or replaced facilities. All new utility lines will be buried.

Potable water is obtained from springs and spring collection boxes near Lake, where there are two 500,000-gallon storage tanks and a 250,000-gallon concrete water reservoir. Chlorination is the only treatment applied to raw water. The water meets the standards of the Safe Drinking Water Act for community public water supply systems. New waterlines will be insulated or buried below the normal frost line.

Wastewater from Lake, Bridge Bay, and Fishing Bridge is treated at the Fishing Bridge sewage treatment plant. Sewage from Lake and Bridge Bay is transported by lift stations to Fishing Bridge. The capacity of the Fishing Bridge sewage system is adequate to handle the small increase that will be generated by development actions. Some sewage lift stations will be replaced with new stations to improve system reliability.

BRIDGE BAY DEVELOPMENT CONCEPT PLAN

CAMPGROUND

The amphitheater, comfort stations, and campsites will be rehabilitated as necessary to correct functional and aesthetic problems. Circulation routes will be improved, and vegetation will be planted between sites for separation and a more pleasant setting. The campground registration area will be redesigned to improve registration efficiency and eliminate long waiting lines. Strategies for the management of bison will be developed, and a monitoring program will be established.

The residence at the ranger station will be converted to accommodate visitor needs, including visitor information/orientation and backcountry permit distribution. A new residence will be built near the ranger station.

A new laundry and shower facility will be added to the camper services building or elsewhere in the campground. Additional shower facilities, if needed, will be located in redesigned comfort stations throughout the campground.

Specific details for site rehabilitation and the redesigned registration area will be determined in a comprehensive design of the campground to be undertaken when funding permits.

MARINA

The marina bulkhead will be repaired. A new pump will be installed at the sewage dump station at the marina to service self-contained boats. The fuel storage area will be made smaller and moved nearer the fueling dock area. Diesel fuel will be provided. Underground fuel storage tanks will be replaced with newer, approved underground fuel storage tanks.

As part of marina maintenance, the mouth of Bridge Bay will be dredged as needed to allow safer boat passage into and out of the bay. How frequently dredging will be required is not known at this time. Dredging operations will require consultation with the U.S. Army Corps of Engineers to ensure compliance with section 404 of the Clean Water Act.

The boat repair shop will be expanded to provide work space for larger boats. Short-term boat trailer storage (up to one week) will remain in the parking area.

Long-term storage will temporarily be moved to the transfer station, where a locked chain-link fence and other measures as required will provide security. Boat storage will be separate from the NPS garbage storage area because of bear management requirements. The transfer station will be screened with vegetation to obscure it from the Grand Loop Road and the campground.

The interior of the marina ranger station will be redesigned to improve efficiency.

GENERAL STORE

The marina and camper concession service store will be modified or expanded on the current site to give additional sales space for camper and boating supplies. A pedestrian walkway will be constructed from the parking area around the east side of the building. Service access to the store will be improved, and a fence or screen will be constructed to visually block the sight of service vehicles from the public.

UTILITIES

Water to Bridge Bay is provided from the Lake area. A larger water distribution line at Bridge Bay will be installed to ensure adequate fire protection. The new line will be insulated or buried below the frost line.

Wastewater will continue to be pumped to Fishing Bridge for treatment. Emergency power equipment or overflow tanks will be installed at the campground lift stations, and one station will be replaced to improve system reliability.

NATURAL BRIDGE

The road to Natural Bridge is closed to public motorized traffic, but it is still used for administrative vehicle access to the borrow pit. The road is now used by the public as a hiking/biking trail to the Natural Bridge feature. Beyond Natural Bridge the road is gated and used for administrative travel only. A trailhead at Grand Loop Road will be developed with parking (15 cars) and an interpretive exhibit to facilitate use of this trail. Disturbed areas along the road will be restored to a natural appearance and conditions, and current erosion problems will be corrected.

ACTIONS TO REDUCE OR ELIMINATE ADVERSE IMPACTS ON THREATENED OR ENDANGERED SPECIES

The threatened grizzly bear is resident in the Lake and Bridge Bay areas. To reduce or eliminate the impacts on grizzly bears from the continued use and modest expansion of facilities, numerous design and management actions will be undertaken. These actions are in addition to the current management actions now enforced in the Lake developed area.

As described in Yellowstone's 1982 *Final Environmental Impact Statement, Grizzly Bear Management Program* and in the park's "Operating Procedures," the major components of Yellowstone's current bear management plan include programs for education and enforcement, reduction of unnatural visitor/bear contact, control of problem bears, incident investigation, statistics and monitoring, and continued bear research. Specific operational procedures for each of these components can be found in the park's "Operating Procedures."

The park's "Annual Bear Management Operation Plan" details the current management action plan for developed areas in the park. The following description is taken from that document, specifically from the "Area Management" and "Management Actions: Developed Areas" sections.

IV. Area Management

A. Reduction of Bear/Human Contacts, Confrontations, and Encounters — The objective is to eliminate unnatural attractants to bears so that control actions are not required.

1) All outdoor trash cans will be of a bear-resistant design and equipped with a plastic removable liner.

2) Roadsides, campgrounds, and all other areas of concentrated visitor use will be maintained litter-free.

3) Garbage pickup will be carefully scheduled to prevent overflow of cans and to assure leaving as little garbage as possible overnight. Campground garbage pickup will be as late in the day as possible. Plastic can liners will be changed at every pickup. Schedule for pickup at roadside pullouts will be dictated by public use level. Overflow of cans is to be prevented.

4) When loaded, trash collection vehicles will proceed to the appropriate transfer station, except that after late-evening pickups, trash may be stored on the collection vehicle inside a closed utility building or within a secured, fenced utility area.

5) Mishandling of garbage by park residents will be reported to the responsible employee's supervisor for remedial action. Repetition of mishandling or any case of deliberate feeding of bears will result in a citation and may be grounds for dismissal or loss of in-park residence privileges.

6) Any area may be closed to human use and/or specific types of visitor activities for the purpose of human safety and/or where the impact of man has a demonstrated adverse effect on the bear population or bear habitat. In this regard, campground opening and closing dates will be manipulated to provide for human safety. Where the potential for bear/human conflicts is extreme during the ongoing visitor use season, areas will be closed by posting. Use of campgrounds located in or adjacent to areas of high grizzly bear density may be restricted at times to hard-sided units only. Entry into closed areas on official business shall be coordinated through the district ranger and approved through the Chief Ranger.

7) Leaving food and/or garbage unsecured when unattended in campgrounds is prohibited. See CFR 2.10, "Camping and Food Storage", CFR 1.7, "Compendium Yellowstone Park."

B. Closures — Any area, road, trail, facility, or campsite can be temporarily closed by any NPS employee when an imminent, life-threatening situation or the potential for serious injury situation exists. This includes the presence of female bears with cubs, persistent bear activity by any sex and age class of bear, or carcasses or other concentrated bear food sources along trails or within any other visitor use area.

V. Management Actions — The prevention of the need for management actions is the primary goal.

A. Developed Areas — All major frontcountry developed areas within Yellowstone National Park are designated either Management Situation 2 or Management Situation 3 grizzly bear habitat. Within Management Situation 2 areas [including the Lake and Bridge Bay developed areas], management decisions will accommodate demonstrated grizzly bear populations and use, if feasible, but not to the exclusion of other uses. When grizzly bear and other uses are mutually exclusive, the other use needs may prevail.

If any bear is consistently frequenting a developed area:

1) Ranger personnel should investigate all reports of bears in developed areas to identify the kind of bear and to learn behavior patterns.

2) Night patrol will thoroughly and carefully inspect the area for any possible food sources/attractants.

3) Ranger personnel should verify the garbage pickup schedule and arrange for late-evening pickup if necessary.

4) Ranger personnel should double-check the food storage situation, i.e., campgrounds, residences' garages, back porches, garbage cans left out, etc.

5) Ranger personnel should investigate any signs of, or rumors of, deliberate feeding and use appropriate means to aggressively suppress this activity.

6) The continued presence of any bear in a campground or developed area, even without evidence of the bear obtaining unnatural foods, demonstrates persistence sufficient to require investigation and may require implementation of any of the following alternatives as determined by the Bear Management Committee: closures, restrictions, translocation, aversive conditions, or removal from the ecosystem.

7) If a bear has obtained unnatural foods or demonstrates the potential for conflict within a developed area, ranger personnel should remove/secure the unnatural attractant and consider immediate management action (translocation, aversive conditioning, or removal).

8) Any bear foraging in the daytime in a developed area should be considered for immediate management action (aversive conditioning or translocation).

9) Night patrol coverage should be intensified to monitor persistent bear activity within developed areas.

10) All persons residing in developed areas should implement the park's food/garbage storage regulations. PREVENTION of bear problems is our primary objective.

In addition to all of these actions and procedures, the following actions are specifically being taken in the Lake and Bridge Bay developed areas at this time. These actions will continue.

Education-based actions:

The education efforts directed towards all employees working in the area will continue. Orientation sessions are provided to NPS and concession employees and to contractors. The National Park Service works closely with supervisors of area employees to ensure compliance with bear closures or other bear management regulations.

Educational efforts are directed toward visitors by providing knowledgeable staff at the Fishing Bridge visitor center beginning Memorial Day weekend and by distributing a special brochure that discusses bears and their management in the Lake area. Additionally, signs are posted on trails in the Lake, Bridge Bay, and Natural Bridge areas to tell people about bear/human conflicts and to convey safety messages. Information is also available in the lobbies of the Lake Hotel and Lake Lodge, the Lake ranger station, and at other appropriate locations.

Human Use-based actions:

All spawning streams around Yellowstone Lake, including those in and near the Lake and Bridge Bay developments, are closed to public entry during the entire spawning season and afterward when warranted by bear activity.

Hiking and/or biking trails between the Fishing Bridge and Lake areas and between the Lake and Bridge Bay areas, as well as the Natural Bridge trail, are closed for the duration

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of spawning season. After the spawning season ends, as documented by weekly spawning surveys, these areas are open to visitor use, but may be closed at any time if deemed necessary due to bear activity on the trail(s).

All closed areas are posted and/or blocked by a physical barrier across the common points of entry. These areas will be marked by signs indicating "Bear Management Area" during spawning season.

At all locations where food is commercially prepared or served and at the Hamilton stores at Lake and Bridge Bay bear-proof food and garbage storage facilities are provided. At all other residential and overnight lodging areas bear-proof garbage containers are provided.

The Sand Point picnic area and beach is closed when bear activity warrants.

Throughout the Lake, Bridge Bay, and Fishing Bridge areas, late-night patrols are conducted and, when necessary due to bear activity, special patrols are implemented.

To implement these and other bear management actions, personnel are assigned to conduct spawning surveys, monitor bear activity, and to assist with crowd control, as necessary.

In addition to these current actions, the National Park Service proposes to initiate the following additional actions. While some actions will be implemented immediately, other actions will be phased in over time, and some will be subject to available funding.

Visitor use of the Lake Lodge and cabins will not begin prior to June 10 annually. Visitor use prior to the opening date, including that for special groups or conferences, will be prohibited. Approximately 25% of the lodge cabins (those closest to Lodge Creek) will not open for public use until fish spawning and associated bear activity ceases, as determined by weekly spawning surveys. These cabins will not be available through advanced reservation until July 15, or earlier if it is determined that fish spawning and associated bear activity has ceased. This action will be reviewed annually to determine the effectiveness of this measure and to allow management to adjust the closure to be most effective. This action is considered an interim plan until the long-term plan for the consolidation of the Lake Lodge cabins can be implemented.

A physical barrier, such as an attractive split-rail fence, will be established between the Lake Lodge cabins and Lodge Creek within the next year. Removable barricades will be in place throughout the spawning season to block vehicle use of the road and discourage pedestrian traffic between the cabins and the spawning stream. This action will be reviewed annually to determine the effectiveness of this measure and to allow management to adjust the closure to be most effective.

The long-term plan for the Lake Lodge cabins is to consolidate them and locate them at least 100 yards away from Lodge Creek.

In the Bridge Bay campground, the G, H, and I loops will remain closed when spawning surveys indicate the presence of bears on adjacent streams during the spawning season.

There will be no advanced reservation of campsites in these loops. This action will be reviewed annually to determine the effectiveness of this measure and to allow management to adjust the closure to be most effective.

During road reconstruction studies, all bridges and culverts will be assessed for their effects on grizzly bears. Where appropriate, culverts or bridges will be designed to accommodate the passage of bears beneath the roadways.

The Otter Creek administrative area, near the north end of Hayden Valley, will be rehabilitated and restored to its natural condition within five to seven years. This action will return approximately 3.5 acres of high-quality habitat to the grizzly bear in the bear management unit that also encompasses the Lake/Bridge Bay areas.

A long-term goal is to rehabilitate and restore the Little Thumb Creek service road and former gravel quarry and Little Thumb Creek to natural conditions. Little Thumb Creek is a cutthroat trout spawning stream that has spawning fish in its undisturbed lower segment and experiences grizzly bear fishing activity. Restoration of the stream corridor and surrounding disturbed area, combined with elimination of administrative access, will return this high-value area to grizzly bears in the bear management unit that also encompasses the Lake/Bridge Bay developed areas. It is anticipated that restoration of the stream corridor will start within two to three years. Restoration of the balance of the former gravel quarry is a goal of the National Park Service. Annually, no activity will be allowed in this area until after fish spawning and associated bear activity ceases. When completed, these efforts will result in the restoration of approximately 11.5 acres of natural, high-quality grizzly bear habitat.

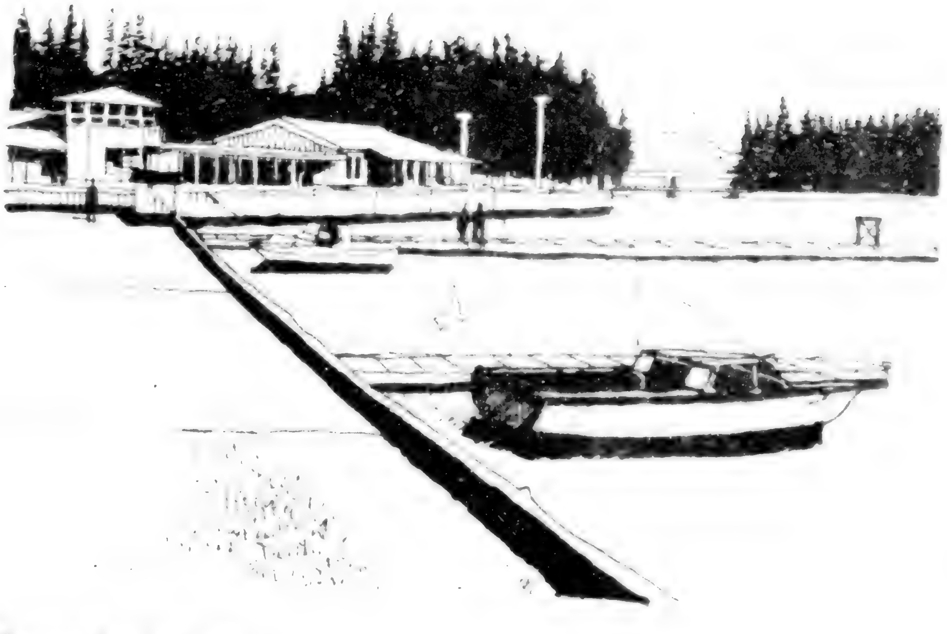
The road to Natural Bridge has been closed to public motorized vehicle traffic. The road to the Natural Bridge feature will be open to the public as a hiking/bicycling trail annually when bear activity does not preclude its use. The road is gated beyond the Natural Bridge feature.

At the Bridge Bay transfer station, improved maintenance operations will continue to ensure that the gate system will prevent bears from obtaining human-foods from inside the transfer station.

As buildings and facilities are relocated or consolidated in the Lake and Bridge Bay areas, site-specific rehabilitation of the areas will be done. Existing social trails deemed unsuitable for use will be rehabilitated beginning in 1993.

The park will investigate retention, relocation, or removal of two historic employee residences adjacent to Hatchery Creek.

APPENDIXES / PLANNING TEAM



Bridge Bay Marina

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APPENDIX A: ALTERNATIVES CONSIDERED FOR LAKE

ALTERNATIVE A — NO ACTION

Alternative A would continue present facilities, circulation patterns, and activities at the Lake developed area. Current maintenance and planned rehabilitation of existing facilities would continue, including the cabins at Lake Hotel and Lake Lodge. As called for in the Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan*, the service station/auto repair facility would be moved from Fishing Bridge to a disturbed site near the entrance to the Lake developed area. The remaining housing at Fishing Bridge would be moved to a site behind the new service station.

ALTERNATIVE B

Under alternative B visitors would have opportunities to walk along the lakeshore at the Lake developed area and to enjoy and experience both the natural and cultural resources of the area. Where appropriate and practicable, historic structures would be adaptively used for interpretive or administrative purposes. Opportunities for increased interaction between NPS staff and visitors would be provided. Visitor use areas would be clearly defined and separated from administrative, maintenance, and staff residential areas. The existing Fishing Bridge service station would be upgraded, and a new repair facility would be constructed at Fishing Bridge; this action would be a change from the approved 1988 Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan*.

Access and Circulation

Access to the Lake developed area from the Grand Loop Road would remain the same as now. To improve access to the lakefront, circulation routes within the area would be redesigned to create a main arterial road that would lead to a visitor contact facility on the lakefront at the former general store (see Alternative B map).

Access to the hospital, the USFWS administrative area, and concessioner employee housing would be provided at a clearly marked four-way intersection on the main entrance road. Access to the Lake Lodge would be provided at a clearly marked T-intersection north of the new visitor parking area. The road would end in a vehicle turnaround.

The present lakeshore road from the hotel to the ranger station would be converted to a pedestrian walkway to eliminate conflicts between pedestrians and vehicles. This area would be easily accessible to the mobility impaired. The existing road from the ranger station to Lake Lodge would be converted to a foot trail. A monitoring program would be set up to evaluate and correct shoreline erosion.

The circulation road in the hotel cabin area would be redesigned as a loop to eliminate existing dead-end roads and to facilitate emergency access.

A hiking/biking trail would be developed along the original lakeshore road to link Lake with Bridge Bay and Natural Bridge, as described for the proposal. A designated hiking trail would be constructed to link Fishing Bridge with Lake.

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Information/Orientation/Interpretation

The general store would be converted for use as a visitor contact facility. This location would provide an outstanding opportunity for onsite interpretation of the cultural and natural features of the Lake area. The visitor facility would contain space for a lobby and sales area, a theater, an exhibit gallery, a special area for children's programs, and office space. Parking would be provided for 150 cars, 6 RVs, and 3 buses. As described under the proposed action, interpretation would focus on Yellowstone National Park as the core of the largest intact ecosystem in the temperate zone of the earth.

General Store/Post Office

A new general store and post office would be constructed in the former contractor's camp near the entrance to the Lake developed area. Parking would be provided for 25 cars, 6 RVs, and 3 buses. All buildings would be designed to be architecturally compatible with the historic structures at Lake.

Fish Hatchery Historic District

The fish hatchery building would be used as a storage area for the U.S. Fish and Wildlife Service. The two housing units nearest Hatchery Creek would be evaluated for retention, relocation, or removal based on evolving information about bears. All trailers and other nonhistoric housing units would be removed, and new housing would be provided in the NPS housing area. The existing dilapidated boathouses would be removed. Boat storage would be provided in the NPS maintenance area. The buildings that contribute to the historic district would be stabilized and rehabilitated to their historic appearance.

Lake Hospital Area

The road to the hospital would be redesigned to clearly lead to the hospital. The walkway to the hospital's main entrance would be posted. The parking area south of the hospital would be removed, and the site would be restored to a natural appearance. A north side parking area for visitors and employees would be redesigned (45 cars). The existing nurses' dormitory would be converted to four housing units. A new dormitory for nurses would be designed to be compatible with the Fish Hatchery Historic District, and parking for 20 cars would be constructed west of the existing hospital quarters. A permanent emergency helipad would be built next to the hospital. The incinerator would be relocated to an area adjacent to the hospital.

A fire station would be constructed in the vicinity of the hospital, and easy access would be provided to the Lake entrance road. The station would include a training room, two truck bays, rescue cache, storage space, and quarters for four employees.

Lakefront Developments

The former service station would be adaptively used, and the surrounding area would be developed into an outdoor plaza for eating or simply resting and enjoying the outdoors. The Hamilton Stores' dormitory behind the general store would be adaptively used.

The lakefront area from Lake Hotel to the historic ranger station would be reserved for pedestrian use. Visitors could take a safe, leisurely stroll among the historic buildings and along the lakeshore to enjoy the resources on a first-hand basis.

Lodging and Food Services

Access and circulation improvements for the Lake Hotel would be the same as for the proposed action. Long-term parking (250 cars and 10 RVs) would remain at the rear of the hotel. Circulation in the cabin area would be redesigned as a loop road. As funds became available, the hotel cabins would be consolidated into motel-type lodging units that would be designed in a compatible architectural style. This redevelopment would eventually reduce the size of the cabin area.

To help alleviate conflicts between bears and humans, the Lake Lodge cabins would be consolidated into motel-type buildings of a compatible architectural style and relocated away from Lodge Creek. These larger, less numerous units would greatly reduce the total size of the cabin area. The larger of the two employee dormitories behind the lodge would be retained. The smaller dormitory and the employee pub would be removed, and a small maintenance building and an employee parking area (50 cars) would be constructed.

NPS Administration/Maintenance/Housing Area

Subdistrict offices for NPS administrative personnel would be relocated from the USFWS structure to the administration/maintenance/housing area.

Temporary maintenance shops and buildings would be replaced and would include boat storage and maintenance offices. The existing fire station in the maintenance area would be enlarged or replaced and would serve this area as well as provide backup for the new Lake fire station.

The NPS housing area would be upgraded and expanded to accommodate year-round and seasonal needs for the National Park Service and the U.S. Fish and Wildlife Service. The housing proposals in this plan are intended to make a more livable community for employees, to maximize vehicular and pedestrian access, and to maintain privacy between units. Trailers and substandard structures would be removed and replaced with well-constructed and weatherproofed units. The new units would be more spacious inside, have larger bedrooms, better furnishings, more storage, and work spaces. All units would be designed to take advantage of views, privacy, aesthetics, and solar gain.

As described for the proposed action, 25 two- or three-bedroom units would be needed to accommodate year-round employees, and 6 existing units would be rehabilitated, with access by a new loop road. An additional 58 efficiency, one-, and two-bedroom units would be needed for seasonal employees, and 33 existing units would be rehabilitated. A total of 7 sites for trailers would be provided.

An NPS community and recreation center (including day-care facilities and a playground), picnic area, and an internal trail network would be constructed. A designated foot trail would provide improved pedestrian access to the main Lake complex.

Concession Housing Areas

As described for the proposed action, concessioner employee housing would be located in two areas. For TWRS employees from Lake Lodge, plus those at Teal dormitory (20 rooms), a new 60-room dormitory would be constructed. An existing cabin or similar-sized quarters would be located in this area to accommodate the hotel's winter maintenance person. RV sites in this area would be relocated to make room for employee parking (100 cars), and new RV sites would be provided near the NPS maintenance and housing area. Two dormitories (55 rooms total) would be constructed near the entrance to the housing area, one for HSI employees and one for YPSS employees, along with parking for 85 cars. An employee pub and recreation area would be constructed near the center of the housing area. This facility would include indoor recreation space for basketball, movies, and other activities, as well as the pub.

A second concession housing area would be next to and north of the NPS administrative area. Wetlands concerns in the area were addressed by detailed mapping of the vegetation and an examination of the soils, and the development boundary was adjusted to avoid sensitive areas. Up to 80 RV sites would be located here. An area that is already used for mobile homes would be redeveloped to accommodate an additional 30 RV sites. Over the long term all of the RV sites would be phased out and replaced with permanent structures. Both developments would be designed, constructed, and managed by the concessioners, with NPS oversight and special emphasis on bear management measures.

Utilities

In most instances existing utilities would be used for relocated or new facilities. All new utility lines would be placed underground. New waterlines would be insulated or buried below the normal frost line. The existing sewage system at Fishing Bridge would be adequate to treat sewage from Lake and Bridge Bay. Some sewage lift stations would be replaced to improve system reliability.

Fishing Bridge

At Fishing Bridge the service station would be retained and brought up to standards. Underground fuel tanks would be replaced with tanks that meet current standards. The existing repair facility would be removed, and a new facility (four or five bays) would be constructed behind the service station. This facility would have the capability of servicing RVs and pickup trucks as well as cars.

Alternative B would require an amendment of the Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan*. This alternative was considered because the Fishing Bridge service station is near a major north/south intersection that is easily accessible to visitors, and close to Sylvan Pass and the RV campground, the sources of most service calls. The gas station would continue to occupy prime grizzly bear habitat in the Fishing Bridge area. All other proposals (such as removing the NPS-operated campground and relocating all employee housing to the Lake area) as described in the *Final Environmental Impact Statement / Development Concept Plan* would be implemented.

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APPENDIX B: DEVELOPMENT COST ESTIMATES

LAKE VILLAGE
(IN 1993 DOLLARS, × 1,000)

DEVELOPMENT ITEM	QUANTITY	GROSS	PLANNING	TOTAL
National Park Service				
Lake Village				
Construct walkway (6′ wide)	2,900 lf	34	7	41
Construct hiking trail (10′ wide)	4.5 mi	278	53	331
Renovate ranger station	5,000 sf	111	21	132
Renovate former gas station	1,500 sf	153	29	182
Construct fire station	2,500 sf	403	77	480
Provide utilities	Lump sum	110	21	131
Construct roads	3,600 lf	548	105	653
Remove roads, parking; restore sites	7,300 sy	115	22	137
Construct trail to Fishing Bridge	3 mi	185	35	220
Remove asphalt	2 mi	204	39	243
Subtotal–Lake		2,141	409	2,550
NPS Maintenance/Housing Area				
Construct south district office	2,000 sf	383	73	456
Construct maintenance offices, shops	10,000 sf	1,611	308	1,919
Construct fire station	2,000 sf	322	62	384
Construct employee housing:				
• Year-round units	25	4,389	838	5,227
• Seasonal units	58	6,838	1,305	8,143
Rehabilitate existing housing:				
• Year-round units	6	440	84	524
• Seasonal units	33	1,427	272	1,699
Provide employee RV sites, with utilities	7 sites	257	49	306
Construct community center	1,600 sf	234	45	279
Construct trail to Lake Village	3,000 lf	35	7	42
Construct access roads	3,000 lf	456	87	543
Construct parking	5,000 sf	72	14	86
Subtotal–NPS Maintenance/Housing		16,464	3,144	19,608
Natural Resource Management Actions				
Rehabilitate the Otter Creek area	3.5 ac	220	42	262
Rehabilitate the Little Thumb Creek area	11.5 ac	734	140	874
Comprehensive revegetation/ rehabilitation of Lake area	Lump sum	587	112	699
Extra personnel for late night bear patrol and for spawning surveys, etc.				23
Subtotal–Natural Resource Management		1,541	294	1,858
Fish Hatchery Historic District[1]				
Stabilize 9 USFWS buildings	12,848 total sf	1,313	251	1,564
Rehabilitate 1 boathouse	8,000 total sf	817	156	973
Remove 1 boathouse, restore site	Lump sum	52	10	62
Subtotal–Fish Hatchery Historic District		2,182	417	2,599
Total NPS Cost		**22,328**	**4,264**	**26,615**

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[1] Estimate does not include a potential fish hatchery museum.

DEVELOPMENT ITEM	QUANTITY	GROSS	PLANNING	TOTAL
U.S. Postal Service				
Construct post office	2,500 sf	347	66	413
Parking area	5 cars	13	3	16
Remove existing post office, restore site	25,000 cf; 280 sy	22	4	26
Total Postal Service Cost		**382**	**73**	**455**

Concessioners — Lake Village		**Total**
HSI construction items		
• Visitor parking	40 cars; 8 RVs; 3 buses	138
• 45 employee dorm rooms	22,500 total sf + 5,600 sf	2,192
• Employee parking	65 cars	110
• Employee RV sites	51 sites	1,428
Subtotal–HSI		3,868
TWRS construction items		
• Redesigned hotel parking	250 cars; 10 RVs	410
• 60 employee dorm rooms	30,000 total sf + 7,500 sf	2,925
• Employee parking	100 + 50 cars	255
• Employee RV sites	27 sites	756
• Winter maintenance person's residence	Lump sum	45
• Removal of laundry, dorm, cabins, and site restoration	Lump sum	180
Subtotal–TWRS		4,571
YPSS construction items		
• 10 employee dorm rooms	5,000 total sf + 1,250 sf	488
• Employee parking	20 cars	38
• Employee RV sites	5 sites	140
• Service station/auto repair facility	Lump sum	800
• Parking area (service station)	15 cars; 3 RVs	46
Subtotal–YPSS		1,512
YPMS construction items		
• 20 nurses quarters	7,500 total sf + 1,500 sf	855
• Employee parking	20 cars	38
• Renovation of dorm into 4 quarters	Lump sum	392
• Renovation of hospital interior	Lump sum	140
• Helipad	Lump sum	34
Subtotal–YPMS		1,459
Employee recreation hall and pub	3,000 sf	336
Total Concessioner Costs		**11,746**

BRIDGE BAY/NATURAL BRIDGE
(IN 1993 DOLLARS, × 1,000)

DEVELOPMENT ITEM	QUANTITY	GROSS	PLANNING	TOTAL
National Park Service				
Campground				
Rehabilitate campsites	420 sites	462	88	550
Rehabilitate amphitheater	750 seats	220	42	262
Rehabilitate comfort stations	16 stations	461	88	549
Enlarge registration building	240 sf	33	6	39
Renovate ranger station	400 sf	55	11	66
Construct ranger residence	Lump sum	59	11	70
Resurface campground road	24,000 lf	1,949	372	2,321
Rehabilitate sewage lift station, add one new station	Lump sum	220	42	262
Remove existing road, restore site	6,700 sy	105	20	125
Screen amphitheater (two sides)	600 trees	220	42	262
Fill borrow pits	17,000 cy	624	119	743
Subtotal–Campground		4,408	841	5,249
Marina				
Renovate ranger station	1,800 sf	132	25	157
Expand camper store, provide walkway and fence	1,000 sf	102	20	122
Repair marina bulkhead	900 lf	660	126	786
Dredge entrance to Bridge Bay[2]	2,400 cy	597	114	711
Construct long-term trailer parking	15,000 sf	59	11	70
Subtotal–Marina		1,550	296	1,846
Entrance				
Improve road	3,000 lf	287	55	342
Natural Resource Management Actions				
Comprehensive revegetation/ rehabilitation of Bridge Bay area	Lump sum	2,934	560	3,494
Subtotal–Bridge Bay		9,179	1,752	10,931
Natural Bridge				
Provide wayside interpretive exhibits	Lump sum	45	9	54
Construct trailhead parking	15 cars	37	7	44
Correct erosion, restore site	Lump sum	29	6	35
Rehabilitate Natural Bridge area	Lump sum	880	168	1,048
Subtotal–Natural Bridge		991	190	1,181
Total NPS Cost		**10,170**	**1,942**	**12,112**
Concessioner				
Install new sewage pump	Lump sum			17
Relocate fuel storage area	Lump sum			168
Construct laundry/shower building	3,800 sf			403
Repair, expand boat building	1,200 sf			114
Total Concessioner Cost				**702**

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[2] Includes probable costs associated with hauling and offsite disposal.

APPENDIX C: FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT

LAKE/BRIDGE BAY DEVELOPMENT CONCEPT PLAN

YELLOWSTONE NATIONAL PARK
IDAHO / MONTANA / WYOMING

In accordance with the provisions of the National Environmental Policy Act of 1969 and the regulations of the Council on Environmental Quality, 40 CFR 1508.9, the National Park Service prepared an environmental assessment (EA) for the *Lake/Bridge Bay Development Concept Plan, Yellowstone National Park*.

The environmental assessment analyzed and evaluated the impacts of the proposal, the no-action alternative, and an additional alternative for the Lake developed area. Under the proposal, and in accordance with the 1988 *Final Environmental Impact Statement / Development Concept Plan* for Fishing Bridge, the service station/auto repair facility and housing from Fishing Bridge will be relocated to Lake in order to protect critical habitat for the threatened grizzly bear. In addition, vehicle circulation routes will be redesigned to alleviate visitor confusion, interpretive opportunities will be provided, and visitor use areas will be clearly defined and separated from administrative, maintenance, and staff residential areas. At Bridge Bay the campground will be rehabilitated, circulation routes improved, and marina facilities upgraded.

On February 3, 1992, the park released the environmental assessment for public review. The comment period closed on April 3, 1992. By April 10, 70 written comments were received. Major concerns included the opening dates for Lake facilities, the funding source(s) for proposed mitigation measures, and the need to finish mitigations agreed to in the Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan*.

In compliance with section 7 of the Endangered Species Act, formal consultation with the U.S. Fish and Wildlife Service occurred. On December 17, 1992, they concurred with the National Park Service's conclusion that the project was not likely to adversely affect the bald eagle *(Haliaeetus leucocephalus)*, peregrine falcon *(Falco peregrinus)*, or whooping crane *(Grus americana)*. They also agreed that the plan is not likely to jeopardize the continued existence of the grizzly bear *(Ursus arctos horribilis)* because of the various management actions proposed by the National Park Service to avoid impacts to the bear.

The NPS proposes to implement the proposed development concept plan for Lake and Bridge Bay. Modifications to the proposal as a result of public review include preparation of a separate environmental assessment for the proposed fish hatchery museum (to be done by the U.S. Fish and Wildlife Service), language with regard to the Natural Bridge hiking/biking trail was made more clear, trails and relocated road segments were more accurately located on maps, wetland habitat was delineated in a concessioner housing area and the area to be developed modified to avoid impact on that wetland habitat, only management actions which the Park Service reasonably believes can be funded and accomplished are included in the final plan, the status of Fishing Bridge mitigations are detailed, a cumulative effects section was added, and it was determined that no action will be taken that could affect cultural resources until survey work is completed and evaluated.

Unavoidable adverse impacts due to proposal include the disturbance, displacement, and removal of 21.5 acres of surface soils and vegetation as well as soil compaction. This could result in increased runoff and some minor soil erosion. The potential for proliferation of exotic plant species will increase

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due to ground disturbance necessary for construction. The proposal will temporarily displace some wildlife. The increase in the number of employees attributable to the proposal and the additional area required for new construction could increase the displacement and mortality risk to the threatened grizzly bear, however, numerous management actions will be implemented to lessen this risk. Localized increases in vehicular emissions, dust, and fumes will occur during the construction activities.

Mitigation measures specific to reduce impacts of the proposed actions on threatened and endangered species are detailed in the plan on pages 30–34. Rehabilitation of historic structures, as well as new construction in areas visible from historic structures or districts will conform with the requirements of the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation and, where appropriate, in consultation with the State Historic Preservation Office.

The Lake/Bridge Bay Development Concept Plan does not constitute an action that normally requires preparation of an environmental impact statement. The plan will not have a significant effect on the human environment. Negative environmental impacts that could occur are minor and temporary in effect. There are no unmitigated adverse impacts on public health, public safety, threatened or endangered species, sites or districts listed on or eligible for listing on the National Register of Historic Places, or other unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, cumulative effects, or elements of precedence were identified. Implementation of the action will not violate any federal, state, or local law.

Based on the foregoing, it has been determined that an environmental impact statement is not required for this project and thus will not be prepared.

Recommended: Superintendent, Yellowstone National Park — Date 3/14/93

Approved: Regional Director, Rocky Mountain Region — Date 3/19/93

APPENDIX D: SUBSTANTIVE COMMENTS ON THE DRAFT *DEVELOPMENT CONCEPT PLAN / ENVIRONMENTAL ASSESSMENT* AND NATIONAL PARK SERVICE RESPONSES

Following are the substantive comments on the draft *Development Concept Plan / Environmental Assessment, Lake/Bridge Bay* (draft DCP/EA) and the NPS responses. The comments are organized under the headings used in the draft document. Similar comments have been consolidated for this analysis.

PROPOSED ACTION — LAKE

Comment: The proposed U.S. Fish and Wildlife Service (USFWS) fish hatchery museum should not be built because it would increase visitor use in sensitive bear habitat.

NPS Response: The U.S. Fish and Wildlife Service will prepare a separate environmental assessment analyzing impacts of the proposed fish hatchery museum. Following this process, if the Fish and Wildlife Service determines to proceed with the facility, an existing historic building — the fish hatchery building — will be used; no new structures will be built. The National Park Service will cooperate with the U.S. Fish and Wildlife Service in preparing the environmental assessment.

Comment: If the proposed USFWS fish hatchery museum is developed, an annual opening date not prior to July 1 should be established to reduce bear/human conflicts.

NPS Response: If the USFWS fish hatchery museum is developed in the historic fish hatchery building, its use will be managed to avoid conflict with the spawning season and associated bear activity, and it will not open prior to July 1.

Comment: Expending federal funds for a "community center" and private concessioner funds for a "recreation hall/pub" is a duplication of community facilities.

NPS Response: The community center and recreation hall/pub would be complimentary rather than competing facilities.

Comment: The maps for the Lake area "Proposed Action" and "Alternative B" locate the redesigned access road leading to the front of the Lake Hotel within the Hotel Creek drainage.

NPS Response: The redesigned road access leading to the front of the Lake Hotel will not impinge on Hotel Creek. The maps have been changed to reflect this.

PROPOSED ACTION — BRIDGE BAY

Comment: The Natural Bridge road, proposed as a hiking/biking trail, should end at the barricade just past Natural Bridge. Beyond this point the road is currently used for administrative purposes only, and any visitor use would increase the chance for bear/human conflicts.

NPS Response: The final plan reflects this comment, the hiking/biking trail will end at the Natural Bridge feature, and the road beyond the gate will be used for administrative purposes only. As stated in the plan, all trails in the area are closed to human use until after the spawning season and may be closed at any time due to bear activity.

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PROPOSED ACTIONS TO REDUCE OR ELIMINATE ADVERSE IMPACTS ON THREATENED OR ENDANGERED SPECIES

Comment: Based on fish spawning and bear use data, opening dates for **all** Lake facilities should be set not prior to July 1.

NPS Response: The Lake and Bridge Bay areas are categorized as management situation 2 areas where management decisions will accommodate grizzly bears, if feasible, but not to the exclusion of other uses. To determine the balance of use between bears and humans is difficult, but based on the Park Service's biological assessment and the USFWS's biological opinion, the Park Service believes an adequate balance has been achieved in this plan. Although Lake facilities open before July 1, their opening is phased, and most areas in the vicinity of Lake Village and Bridge Bay are closed to human entry during key periods in order to keep people and bears separated. Spawning surveys and associated bear use data have been collected weekly for the past few years and will continue to be collected in future years. This information is used to determine the opening of the Lake Lodge cabins closest to Lodge Creek, as well as loops G, H, and I of the Bridge Bay campground and trails and other areas in the Lake and Bridge Bay vicinities.

Comment: The mitigations proposed in the 1988 Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan* are not yet accomplished. Prior to any new construction at Lake, these actions must be completed.

NPS Response: The *Final Environmental Impact Statement / Development Concept Plan* for Fishing Bridge contained a list of mitigating measures that would be implemented as part of the proposal. A summary of the January 1993 status of the mitigation measures can be found in appendix E of this document. Much has already been accomplished, and efforts toward completion of the mitigation measures, as funding permits, are underway.

Comment: An implementation schedule, as well as a description of funding source(s) for the mitigations proposed, must be added.

NPS Response: The National Park Service has made every effort to include in this document only those actions that can be accomplished in a reasonable time frame with known funding. Because of funding constraints, certain actions proposed in the draft plan have been dropped from the final plan.

Comment: The use of Concessioner Improvement and Maintenance Project (CIMP) funds to implement mitigation measures is an appropriate use of these funds.

NPS Response: CIMP monies are strictly regulated. Where appropriate and feasible, they will be used.

Comment: No rationale is given in the draft DCP EA for how the rehabilitation of Otter Creek, Little Thumb Creek, and Natural Bridge will benefit the grizzly bear enough to offset impacts at Lake.

NPS Response: The Park Service's rationale for the value of rehabilitating Otter Creek and Little Thumb Creek are detailed in appendix G of this document.

The rehabilitation of Natural Bridge pit was dropped from this proposal because firm funding sources for the work could not be obtained. The long-term goal of the Park Service is to rehabilitate this pit. The Natural Bridge pit was referred to as the Bridge Bay quarry by the Federal Highway Administration in the *Parkwide Road Improvement Plan* and listed as a possible materials source for that project. The Federal Highway Administration has subsequently determined that the rock material in this quarry is unsuitable for use in the road improvement project. thus the quarry will not be used. and rehabilitation funds from this source will not be available.

Comment: The DCP notes that bears using spawning streams are impacted by the presence of people up to 1 kilometer away. Moving the Lake Lodge cabins a few yards one way or the other is likely to result in little benefit to the bear.

NPS Response: The Lake area is categorized as a management situation 2 area where management decisions will accommodate grizzly bears. if feasible. but not to the exclusion of other uses. Because human use of the Lake area will continue. actions to separate bears and humans are proposed. including the erection of a fence between the cabins and the creek to discourage people from approaching the creek and the staged opening of the Lodge cabins until spawning and associated bear activity ceases. The eventual consolidation of the lodge cabins 100 yards from the creek is the long-term goal of management in this area. This distance provides an increased measure of safety for both humans and bears.

NATURAL RESOURCES — SOILS AND VEGETATION

Comment: The Geological Survey of Wyoming recommends that any new buildings constructed be able to withstand an earthquake of magnitude 6.0 to 6.5.

NPS Response: Buildings will be designed to meet appropriate earthquake standards.

NATURAL RESOURCES — FLOODPLAINS WETLANDS

Comment: A more thorough wetlands survey is needed of the proposed RV housing site in the Lake administrative area.

NPS Response: A wetlands survey of this area was conducted and resulted in approximately 3 acres being removed from the proposed development bubble. Facilities will be located to avoid impacts on wetland resources. NPS procedures for implementing Executive Orders 11988 "Floodplain Management" and 11990 "Protection of Wetlands" will be followed.

Comment: The proposed site for the relocation of the service station/auto repair facility is near a wetland area. which could effect the burial of underground storage tanks.

NPS Response: A more detailed wetlands survey of this area did not find any classified wetlands. Groundwater and drainage paths in the area will be dealt with in the design of the facility.

Comment: No development should be within 500 yards of any wetland. riparian area. stream. or the lakeshore.

NPS Response: The Lake development has been in place for over 100 years. and major portions of the development are within 500 yards of water. The National Park Service has no fixed setback standard from water resources: however. any new construction will meet NPS floodplain and wetland guidelines. Where possible buildings will be 100 yards from streams.

NATURAL RESOURCES — THREATENED AND ENDANGERED SPECIES

Comment: Because the current development at Lake will continue to have bear/human conflicts due to the spawning streams in the area, it appears contradictory to state that the no-action alternative (current conditions) "may affect" the grizzly population, while the combined effect of the existing conditions and proposed action is "not likely to adversely affect the existence of the grizzly bear population in the ecosystem."

NPS Response: In assessing the effects of any proposed action on threatened and endangered (T&E) species, the National Park Service first determines if the proposed project is in an area known to have T&E species or their habitat. If the answer is yes, then biologists determine whether the proposed project will have no effect or whether it may affect those T&E species. NPS biologists determined that the no-action alternative (current conditions), as well as all other alternatives presented in the draft DCP/EA, may affect the grizzly bear population at Lake and Bridge Bay.

Because of this determination, the next phase of this step-down procedure is to determine whether the proposed project is or is not likely to adversely affect the T&E species' population. This analysis and determination is described in the biological assessment portion of the *Environmental Assessment* ("Affected Environment and Environmental Consequences, Threatened Species — Grizzly Bears"), which was sent to the U.S. Fish and Wildlife Service during section 7 consultation. The National Environmental Policy Act only requires that this determination be made for the proposed action.

Comment: The Park Service should initiate formal section 7 consultation with the U.S. Fish and Wildlife Service because of the significant effects this proposal could have on grizzly bears.

NPS Response: Either agency may initiate formal consultation. In response to concerns raised by the Fish and Wildlife Service, the Park Service initiated formal section 7 consultation on June 17, 1992. The resulting USFWS biological opinion is incorporated in this final document in appendix F.

NATURAL RESOURCES — CUMULATIVE EFFECTS

Comment: The draft DCP/EA makes no attempt to analyze how its proposed activities integrate with other park development proposals or current park operations.

NPS Response: An analysis of the cumulative effects due to the implementation of the proposed action has been revised. The plan now includes a discussion of current development plans within Yellowstone National Park and information about development plans for the lands surrounding the park, those within the greater Yellowstone ecosystem.

Development actions that will be occurring in the park during the next few years include:

- The Federal Highway Administration project to reconstruct, resurface, and rehabilitate the principal roads in Yellowstone. During the next few years the following road sections will be worked on:

  > Three areas of the road system would be repaved only in order to extend the life of the roads until such time as the roads can be reconstructed. The road segment from the west entrance to Madison Junction, which was begun in late 1992, will be completed in early summer 1993. The segments from Norris to Canyon Village and from Gibbon Meadow to the Gibbon River bridge near Norris junction will be repaved in 1993.

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The road segment from Madison Junction to Biscuit Basin will be reconstructed following completion of the compliance document, possibly in 1994.

The road segment from Tower to the northeast entrance is scheduled for resurfacing in order to extend the life of the road until such time as it can be reconstructed. This segment would be done following completion of compliance, possibly as early as 1995.

Reconstruction of the east entrance road is expected to begin in late 1993, following completion of the compliance document. The section of road between Lake Butte and Sylvan Pass is scheduled for reconstruction first.

- The "Finding of No Significant Impact" for the housing initiative (HUDAT) environmental assessment was released in December 1992. Construction on some housing units will occur each year, with facilities at West, Canyon, and/or Tower having priority.

- Housing construction for Federal Highway Administration personnel at Lake, which began in late 1991, will be completed in 1993.

- Two houses will be constructed in the lower Mammoth housing area in 1993.

- Work will continue on the sewage treatment facility for Canyon Village in 1993.

- At Old Faithful various concession-related construction projects are proceeding in accordance with the *Development Concept Plan* for Old Faithful. These include the construction of a bus barn, employee pub/recreation facility, an employee dormitory, and a medical clinic/ranger station, plus the replacement of the Snow Lodge building.

- A warming hut will be constructed at Madison Junction in 1994, following completion of appropriate compliance.

- The lodge registration building at Grant Village is scheduled for removal and replacement in 1994. This action would move the building closer to the lodging units and allow views of the lake as one enters the village area.

- US WEST expects to complete in 1993 a project begun in 1992 to bury new telecommunication cable in developed areas of the park. Cables will be laid in the Fishing Bridge, Grant Village, Madison, and Mammoth areas following completion of cultural compliance.

- Funds from the state of Montana under the abandoned mine lands program will be used to rehabilitate the McMinn Coal Mine on the slopes of Mt. Everts.

- If funding is available for archeological compliance, rehabilitation work in the Fishing Bridge campground area will continue. This work consists of the removal of road asphalt and any necessary recontouring prior to revegetation of the area.

- Under the Leaking Underground Storage Tank Act, many fuel oil tanks currently in use at residences throughout the park will be replaced.

Outside of Yellowstone's borders, a number of known projects are occurring, including the following:

- The Noranda and Crown Butte, Inc., mining companies submitted an application to the state of Montana for a permit to mine gold, silver, and copper in an area 2 miles northeast of Yellowstone National Park near Cooke City, Montana. Even though the proposal is still in the early stages and an environmental impact statement will need to be completed, some exploration work associated with obtaining the permits is proceeding.

- Mineral Hill Mine is located at Jardine, Montana, approximately 3 miles north of the park. This cyanide vat-leaching gold mining operation is continuing, with additional exploratory drilling and ore testing occurring in the adjacent area.

- Oil and gas leases exist outside the park boundaries, but currently no wells are in production. The only known potential oil or gas exploration near Yellowstone is the proposed Ruby exploratory oil/gas well on the Line Creek Plateau, south of Red Lodge, Montana, and 33 miles east of Yellowstone National Park.

- The Royal Teton Ranch, north of the park's boundary, has water rights to geothermal flows from natural springs in the area of Corwin Springs, Montana. Legislation is pending in Congress to prohibit any development of thermal resources within the Corwin Springs known geothermal area. Following the completion of Montana's supplemental environmental impact statement on development proposals of the Church Universal and Triumphant, it is expected that some construction of facilities would begin.

- The Firehole Land Corporation is proceeding with an 87-acre land development in West Yellowstone, Montana, immediately adjacent to the park. The proposed development, known as Grizzly Park, will contain a large-format IMAX theater, a live bear exhibit, shops, and other commercial properties. Construction on this development began in 1992.

The cumulative effects of the various actions within the park on most wildlife species are generally localized. Although these localized effects appear to be temporary in nature, the lasting effects are unknown. Certain wide-ranging wildlife species, such as the grizzly bear, could be affected by the number of construction projects in the widely varying locations. However, most of these construction projects would occur within current development zones and along roadways, areas that bears are aware of and tend to avoid. The stringent mitigating measures proposed should ameliorate effects on these species. Most of the projects are maintenance in nature (road rehabilitation, housing construction, sewage treatment facility), providing appropriate facilities for visitors and employees. The other projects are rehabilitative in nature and are a result of Yellowstone's commitment to restoring to natural conditions disturbed areas in the park as directed by NPS *Management Policies*.

The cumulative effects of the various actions within the park on visitors would primarily be felt by short-term visitors who stay in one area. Their entire visit may be disrupted by construction activities. Employees could be inconvenienced for a number of days or weeks by local construction projects.

Comment: A rigorous cumulative effects analysis for effects on grizzly bears is needed.

NPS Response: The lack of a working cumulative effects model limits the Park Service's ability to quantitatively assess various management actions in relation to grizzly bear habitat quality and mortality. However, the Park Service's biological assessment of the effects of the proposed actions (as revised) has included the use of the grizzly bear mortality risk submodel, as developed for the analysis in the 1988 *Final Environmental Impact Statement / Development Concept Plan* for Fishing Bridge.

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There are certain problems with this submodel as currently used, including the assumption that all lodging units contribute equally to bear mortality and that every day each unit is open contributes equally to bear mortality.

Another problem is that the submodel does not incorporate current data on bear use of spawning streams. This data indicates that there is considerable year-to-year variation in the timing of spawning runs related to the timing of spring runoff and the breakup of Yellowstone Lake. The logarithmic equation used in the mortality risk submodel does not take into account the temporal variability of bear use that occurs each year. For example, during years in which the spawning season ends early, such as in 1992, the effect of opening facilities early in the season (approximately June 10) would be much less disturbing to bears (which are less likely to be present) than during years when the spawning season continues into July (and bears are likely present in the area much longer).

Consequently, in the absence of a working, updated cumulative effects model, the Park Service used the best available data, including the mortality risk submodel, in the analysis of the proposed action. The Park Service concluded, and the U.S. Fish and Wildlife Service concurred, that the best management decision for certain facilities closest to areas of potential bear activity is flexible opening dates, which depend on the spawning season and associated bear activity.

CULTURAL RESOURCES

Comment: The document lacks sufficient information on archeological and historic resources to determine if cultural resources eligible for the National Register of Historic Places would be affected or not.

NPS Response: All ground-disturbing actions will be preceded by an intensive archeological survey, in accordance with the "Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation" (48 FR 44716-40, Sept. 29, 1983). Any previously unrecorded archeological resources will be documented in accordance with NPS standards, and a formal determination of eligibility to the National Register of Historic Places, in consultation with the Wyoming State Historic Preservation Office, will occur.

Prior to the removal or relocation of any roads or buildings, the structures will be evaluated for eligibility to the National Register of Historic Places, in consultation with the Wyoming State Historic Preservation Office. New facilities constructed in the vicinity of historic structures will be evaluated for their effect on the historic resources.

CONCESSIONS

Comment: The service station/auto repair facility should remain at Fishing Bridge.

Response: The gas station and associated employee dormitories at Fishing Bridge will be relocated to Lake as decided and approved in the 1988 *Final Environmental Impact Statement / Development Concept Plan* for Fishing Bridge.

APPENDIX E: STATUS OF FISHING BRIDGE MITIGATING MEASURES

The 1988 *Final Environmental Impact Statement / Development Concept Plan* for Fishing Bridge contained a list of mitigating measures that would be implemented as part of the proposed action. The following summarizes the January 1993 status of the mitigating measures.

- The **Fishing Bridge campground** closed in 1989, but it has not been fully rehabilitated due to lack of funds. Funding for rehabilitation has been repeatedly requested. A new fiscal year (FY) 1994 funding request, tied to campsite replacement, has been submitted. The request includes monies for completing rehabilitation of the campground.

  The Park Service has removed all but the historic aboveground structures. Because of the area's cultural significance, ground-disturbing work (removal of asphalt and building foundations, revegetation) cannot be done until an archeological survey and an evaluation of the national register significance of the cultural resources has been completed. The Park Service arranged to have an archeologist begin surveys in the area in 1992. The archeologist recommended that because the area was previously disturbed and if careful monitoring was utilized, actions requiring minimal soil disturbance could proceed in the back two loops of the campground. Further rehabilitation will proceed in subsequent years as funding for intensive archeological surveys, cultural monitoring, and vegetative rehabilitation is obtained.

- The formula for **campsite replacement** was met, and planning for that replacement began in 1991. During preliminary planning the Park Service recognized that conditions had changed significantly since 1988. Because of new information, especially concerning grizzly bears, a new proposal for campsite replacement was developed. This proposal was substantially different from the original, necessitating the preparation of a supplemental environmental impact statement for campsite replacement. The Park Service anticipates that the draft environmental impact statement will be available in late spring 1993.

- The **Bridge Bay campground** was added to the nationwide campsite reservation system in 1988 in order to provide better utilization of existing campsites. When feasible, this reservation system will be expanded to other campgrounds in Yellowstone.

  The rehabilitation and upgrading of Bridge Bay campground facilities has been delayed until the completion of the *Development Concept Plan* for Lake/Bridge Bay. Funding for this rehabilitation is included in the FY 1994 funding request tied to campsite replacement.

- The **photo shop, tourist cabins, tourist cabin office, and all but one of the remaining cabin storage sheds** were removed by 1991.

- The **auto repair shop and service station** are still operating at Fishing Bridge. Relocation, which was approved in the 1988 Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan*, has been delayed pending completion of the Lake/Bridge Bay *Development Concept Plan*. Once that plan has been approved, this facility can be removed by the concessioner within two years and the area rehabilitated with concessioner funds.

- The **Hamilton Stores' boys dorm, the Yellowstone Park Service Station dorm, and five employee cabins** are still being used until these facilities can be replaced in the Lake developed area. The action was approved in the 1988 Fishing Bridge *Final Environment Impact Statement / Development Concept Plan*, but it was delayed pending completion of the Lake/Bridge Bay *Development Concept Plan*. Replacement facilities can be in place within two years once the Lake/Bridge Bay plan has been approved. Vegetative rehabilitation of the area will follow facility removal and will be paid for by the concessioner.

- The Fishing Bridge **sewage treatment plant road** has been restricted to administrative vehicle use only since 1986.

- The Fishing Bridge **contractor's camp and ballfield** along the sewage treatment plant road were last used in 1986. The **helipad** is used on an emergency basis only. These areas are not yet restored to natural conditions.

- All **informal trails radiating from the Fishing Bridge RV campground** have been closed and signs placed at the campground perimeter advising campers that the areas beyond the campground are closed. Rehabilitation of the informal trails began in 1992.

- Due to budget limitations, there has been no **routine early morning patrol** around the perimeter of the RV campground. Late-night patrols are conducted in the Lake/Bridge Bay/Fishing Bridge area. If bears are known to be in the area, special all-night patrols are initiated.

- The **Turbid Lake road** in Pelican Valley has been closed to all vehicle travel but has not yet been removed due to lack of funds. The road is currently used as an unmaintained trail.

- The **backcountry campsites in Pelican Valley** were closed and have not been used since 1986. The trails have not been relocated. Formal consultation with the U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act was reinitiated on this issue in conjunction with formal consultation on the campsite replacement EIS.

- **Pelican Valley** has been restricted to day use only (9 A.M. until 7 P.M.) since 1984. Additionally, regulations were put in place in 1984 that close Pelican Valley to all use between April 1 and July 3 in order to prevent displacing bears from prime habitat during the spring and early summer.

- **Off-trail travel in Pelican Valley** has not yet been prohibited. Because fishermen are the majority users of Pelican Valley and because the streams are not next to the trail, it would be difficult to implement this action. Formal consultation with the U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act was reinitiated on this issue in conjunction with formal consultation on the campsite replacement environmental impact statement.

- During the spawning season, **areas immediately surrounding all spawning streams** tributary to Yellowstone Lake are closed to human use.

The park staff are monitoring changes in visitor use patterns and grizzly bear activity, and they are taking appropriate actions to minimize bear/human conflicts. The 1988 Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan* stated that if high levels of conflict occur in the RV park vicinity, additional measures, including the removal of other facilities (for example, the RV park, general store, picnic area), will be considered. To date, high levels of conflict have not occurred.

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Implementation Schedule Proposed in the 1988 Fishing Bridge Final EIS DCP

1988 Implement the campsite reservation system for Bridge Bay campground. [This was done in 1988.]

Reduce the number of campsites available at Fishing Bridge campground by two loops (102 sites) and restore the abandoned loops. [The campground loops were closed in 1988 and were restored in 1992.]

Begin planning for the Bridge Bay campground rehabilitation. [The *Lake/Bridge Bay Development Concept Plan/Environmental Assessment* was started in 1988.]

Begin the implementation of the management actions package as previously detailed, with a goal of completion by the end of 1990. [See above for details.]

1989 Expand the campsite reservation system to other campgrounds in Yellowstone National Park. [This has not been done because of various problems encountered with the reservation system.]

Reduce the number of campsites available at the Fishing Bridge campground by three additional loops (108 sites) and restore the abandoned loops at the end of the season; close the Fishing Bridge campground permanently. [The three loops were closed in 1989; the campground was permanently closed at the end of the 1989 season; two of the nine campground loops were restored in 1992.]

Commence the Bridge Bay campground rehabilitation. [This action was delayed pending completion of the Lake/Bridge Bay *Development Concept Plan / Environmental Assessment*. Funding has been requested for this action.]

Begin to relocate employee housing. [This action was delayed pending completion of the Lake/Bridge Bay *Development Concept Plan*.]

1990 Restore the remaining loops at Fishing Bridge (100 sites). [This has not yet been done.]

Continue the Bridge Bay campground rehabilitation. [This action was delayed pending the completion of the Lake/Bridge Bay *Development Concept Plan*.]

1991 Complete the Bridge Bay campground rehabilitation, the relocation of employee housing, and the restoration of abandoned areas at Fishing Bridge. [This action was delayed pending completion of the Lake/Bridge Bay *Development Concept Plan* and due to lack of funds for rehabilitation at Fishing Bridge.]

APPENDIX F: BIOLOGICAL OPINION, U.S. FISH AND WILDLIFE SERVICE

United States Department of the Interior
FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
2617 East Lincolnway, Suite A
Cheyenne, Wyoming 82001

IN REPLY REFER TO

W.25 NPS
Yellowstone NP -
Lake DCP

December 17, 1992

MEMORANDUM

To: Superintendent, Yellowstone National Park

From: State Supervisor, FWE, Cheyenne, WY (FWE-61411)

Subject: Lake/Bridge Bay Development Concept Plan

This is the U.S. Fish and Wildlife Service's (FWS) biological opinion prepared in response to your June 17, 1992 request for formal consultation under Section 7 of the Endangered Species Act (ESA) on the proposed draft Development Concept Plan (DCP) and Environmental Assessment for the Lake/Bridge Bay area of Yellowstone National Park, Wyoming.

We concur with the conclusions reached in the biological assessment that there will be no adverse affects on the bald eagle (Haliaeetus leucocephalus), peregrine falcon (Falco peregrinus), or whooping crane (Grus americana). This biological opinion considers only the effects of the proposed development plan on the threatened grizzly bear (Ursus arctos horribilis). We have examined the proposed actions in accordance with the procedural regulations governing interagency cooperation under Section 7 of the ESA of 1973, as amended (50 CFR 402 and 16 USC 1521 et seq).

BIOLOGICAL OPINION

It is the our biological opinion that the proposed development and relocation of facilities, as outlined in the draft Lake/Bridge Bay Development Concept Plan, are not likely to jeopardize the continued existence of the grizzly bear. This opinion is based on implementation of actions by the National Park Service as proposed in their Lake/Bridge Bay DCP and supporting documents and outlined on pages 2-4 herein.

PROJECT DESCRIPTION

The Lake and Bridge Bay Developed Areas lie roughly three miles apart on the northwest shore of Yellowstone Lake. Currently, the Lake area contains visitor, National Park Service (NPS), and concession facilities. These include the Lake Hotel, Lake Lodge and cabins, general store, post office, concessioner housing and parking areas, ranger station, office buildings, boat houses (2), maintenance facilities, NPS employee residences, hospital, and FWS office/lab complex and housing. The Bridge Bay area includes a marina and associated facilities (boat rental and repair), ranger station, concessioner store, 420-site campground, amphitheater, and campground ranger station.

The Lake/Bridge Bay DCP presents alternatives for construction of lodging, recreational, and support facilities for visitors, as well as NPS and concessioner employees. It will involve renovation or replacement of existing facilities and new development including relocation of the service/auto repair station and NPS/concessioner housing from Fishing Bridge to the Lake Developed Area in accordance with the 1988 **Final Environmental Impact Statement/Development Concept Plan for Fishing Bridge.**

The preferred alternative (see Appendix A) calls for retaining the main entrance road into Lake with relocation of some intersections and spur roads. Construction of a new service station/auto repair facility (plus a 20+ car parking area), and two dormitories for service station and Hamilton Store employees (55 rooms and 85 car parking). Existing historic boat houses, offices, laboratory, housing, and storage in the Fish Hatchery Historic District would be retained, while all trailers and nonhistoric housing units would be removed and replaced in the NPS housing area. Additional construction includes an emergency helipad, new fire station/emergency services building, conversion of the existing nurses dorm (into 4 housing units), and a new 20-room nurses dorm and parking lot. Parking would be provided for the ranger station and remodeled subdistrict ranger office. The existing Post Office would be removed and a new Post Office and parking area constructed.

Visitor Lodging - Hotel cabins would be retained until funds become available to consolidate them into motel-style units. The plan also calls for consolidating the Lake Lodge cabins into motel-style units located away from Lodge Creek beginning within the next 10 years, using concessioner's capital improvement and maintenance fund monies. In the Lake Lodge area, one small dorm and employee pub would be removed. The two larger employee dorms will remain and a new (50-car) parking area and maintenance building will also be constructed directly behind the Lake Lodge.

NPS - Maintenance offices/shops and storage facilities would be constructed and/or expanded. Additional construction would include replacement of temporary and substandard housing (25 new year-round, two- and three-bedroom housing units and 58 seasonal efficiency, one- and two-bedroom units), seven new RV sites, a NPS community center, playground facilities, picnic area, additional access roads, and a trail network.

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Concession Housing - A new 60-room dormitory would be constructed on the existing Teal dorm site. The current RV site would be relocated to allow for a 100-car parking lot. An employee pub and recreation area would be built as well as a 80-RV site concessioner housing area near the existing NPS administrative area.

Every attempt was made to keep additional development within the current "bubble" of disturbed ground rather than increasing the limits of the developed areas. Developments proposed in the Lake/Bridge Bay areas would add an additional 24 acres to the total amount of disturbed ground, 14 acres of which is outside the existing Lake/Bridge Bay developed area. Expansion of the boundaries of the Lake development would occur primarily in the NPS housing area with the addition of the 80 unit RV site and housing units on the northwest side of the development.

The National Park Service proposes to implement the following management actions as part of the DCP to offset or minimize impacts to grizzly bears (displacement, potential habituation, and the eventual removal of grizzly bears utilizing spawning stream habitat) from replacement of these and construction of new facilities at Lake Developed Area. While some actions will be implemented immediately, others will be phased in over time. Some actions are considered part of the proposed Federal action herein, but are not currently budgeted for as part of the original project and will require additional funding requests (NPS 1992b).

1. Visitor use of the Lake Lodge and cabins will not begin prior to June 10 annually. Visitor use prior to the opening date, including that for special groups or conferences, will be prohibited.

2. Approximately 25 percent of the lodge cabins (those closest to Lodge Creek) will not open for public use until fish spawning and associated bear activity ceases as determined by weekly spawning surveys. These cabins will not be available through advanced reservation until July 15, cabins could be opened earlier if it is determined that fish spawning and associated bear activity has ceased. This action will be reviewed annually by the NPS to determine the effectiveness of this measure and to allow management to adjust the closure to be most effective. This action is considered an interim plan until the long-term plan for the consolidation of the Lake Lodge cabins can be implemented. Phaseout of these cabins would begin within the next 10 years.

3. A physical barrier such as a split-rail fence will be established between the Lake Lodge cabins and Lodge Creek within the next year. Removable barricades will be in place throughout the spawning season to block vehicle use of the road and discourage pedestrian traffic between the cabins and the spawning stream. This action will be reviewed annually to determine the effectiveness of this measure and to allow management to adjust the closure to be most effective.

4. The long-term plan for the Lake Lodge cabins is to consolidate them and locate them at least 100 yards away from Lodge Creek.

5. Loops G, H, and I in the Bridge Bay campground will remain closed when spawning surveys indicate the presence of bears on adjacent streams during the spawning season. There will be no advanced reservation of campsites in these loops. This action will be reviewed annually to determine the effectiveness of this measure and to allow management to adjust the closure to be most effective.

6. During road reconstruction studies, all bridges and culverts will be assessed for their effects on grizzly bears. Where appropriate, culverts or bridges will be designed to accommodate the passage of bears beneath the roadways.

7. The road to Natural Bridge has been closed to public motorized vehicle traffic. The road to the Natural Bridge feature will be open to the public as a hiking/bicycling trail annually when bear activity does not preclude its use. The road will be gated/closed beyond Natural Bridge.

8. Improved maintenance operations will be implemented at the Bridge Bay Transfer Station to assure that the gate system will prevent bears from obtaining human-foods/garbage from inside the transfer station.

9. As buildings and facilities are relocated or consolidated in the Lake and Bridge Bay areas, site-specific rehabilitation of the areas will be done. Existing social trails deemed unsuitable for use will be rehabilitated beginning in 1993.

10. The NPS will investigate relocation or removal of two historic employee residences adjacent to Hatchery Creek.

The NPS has expressed its intent and willingness to use the Cumulative Effects Model and Cumulative Effects Analysis Process (CEAP) (see page 10) on a more Park-wide/broader scope in the future to determine/quantify the environmental baseline and effects of proposed actions. Until this system and the CEAP can be implemented, the Park's goal is to minimize loss of grizzly bear habitat effectiveness. Based on this premise, the NPS also proposes the following measures as part of its proposed action:

A. The **Otter Creek** administrative area, near the north end of Hayden Valley, will be rehabilitated and restored to its natural condition within five to seven years. This action will return approximately 3.5 acres of high-quality habitat to the grizzly bear in the bear management unit which also encompasses the Lake/Bridge Bay areas.

B. A long-term goal is to rehabilitate and restore the **Little Thumb Creek** service road and former gravel quarry and Little Thumb Creek to natural conditions. Little Thumb Creek is a cutthroat trout spawning stream that has spawning fish in its undisturbed lower segment and experiences grizzly bear fishing activity. Restoration of the stream corridor and surrounding disturbed area, combined with elimination of administrative access, will return this high-value area to grizzly bears in the Bear Management Unit which also encompasses the Lake/Bridge Bay developed areas. It is anticipated that restoration of the stream corridor will start within two to three years. Restoration of the balance of the former gravel quarry is a goal of the NPS. Annually, no activity will be allowed in this area until after fish spawning and associated bear activity ceases. When completed, these efforts would result in restoration of approximately 11.5 acres of natural, high-quality grizzly bear habitat.

BASIS OF OPINION

ENVIRONMENTAL BASELINE

The "**environmental baseline**" includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, anticipated impacts of all proposed Federal projects in the action area that have already undergone Section 7 consultation and impacts of any State or private actions which are contemporaneous with the consultation process.

Current Status/Management of the Grizzly Bear

Under the authority of the Endangered Species Act of 1973, as amended (ESA) the grizzly bear (Ursus arctos horribilis) was listed as a threatened species in 1975. Currently in the conterminous United States, the grizzly population has been reduced to roughly two percent of its former range with only five areas remaining in mountainous, parkland, and wilderness regions of Washington, Idaho, Montana, and Wyoming supporting either self-perpetuating or remnant populations (FWS 1992).

The exact size of the Yellowstone grizzly bear population is unknown as the very nature of the species and the rugged terrain it inhabits makes any census extremely difficult. Therefore, monitorable population parameters are used as an alternative index to population abundance (Knight and Eberhardt 1987). The Interagency Grizzly Bear Study Team estimates the grizzly bear population in the Greater Yellowstone Ecosystem in 1991 at a minimum of 228 bears (USFWS 1992).

Occupied grizzly bear habitat within the Greater Yellowstone Ecosystem is divided into 18 grizzly bear management units (BMUs). The Lake/Bridge Bay Developed area lies within the Firehole/Hayden Bear Management Unit, near its boundary with the Pelican /Clear, and Two Ocean/Lake BMUs. Most of the proposed project area (that within the front-country developed areas of Lake and Bridge Bay) is designated as Management Situation (MS) 2 habitat, with spawning streams (and adjacent habitat) running through the area designated as Management Situation 1. MS 1 boundaries were delineated after development adjacent to spawning streams had already occurred, thus boundaries had to accommodate existing human use and were placed along recognizable topographic features. Where possible an attempt was made to maintain at least a 100 yard buffer around streams, but specific information and maps detailing areas around spawning streams designated as MS 1 are not available. As outlined in the Interagency Grizzly Bear Guidelines and the Park's Annual Bear Management Operation Plan, management decisions within Situation 2 habitat will accommodate demonstrated grizzly bear populations and bear use, if feasible, but not to the exclusion of other uses.

The recovery goals established for the grizzly bear population in the Greater Yellowstone Ecosystem in the 1982 Grizzly Bear Recovery Plan initially called for establishment of a grizzly bear population equal to or greater than the 301-bear population documented by Craighead et al. (1974) along with attainment of a set of specific population and biological parameters. These recovery goals have been modified based on extensive research on grizzly bear populations and techniques for population viability analysis and population monitoring. The recovery goals outlined in the agency draft revised Grizzly Bear Recovery Plan (FWS 1992) include:

1) observation of 15 females with cubs over a six year average.

2) 16 of 18 Bear Management Units occupied by females with young from a running 6-year sum of verified observations, and no two adjacent BMU's unoccupied (with a study to be initiated in the Plateau and Henry's Lake BMU's to determine the capability of these BMU's to support females with young).

3) known, human-caused mortality not to exceed four percent of the current population estimate (based on the most recent three-year average of females with young) and;

4) no more than 30 percent of the known, human-caused mortality shall be females.

5) demonstration of the existence of adequate regulatory mechanisms for population and habitat management through the development of a conservation strategy.

Yellowstone National Park Bear Management Policy

The objectives of bear management policy in Yellowstone (NPS 1978) are to "preserve and maintain natural populations of bears as part of the Park's native fauna and provide for safety of Park visitors: Park Service bear management is oriented towards eliminating or minimizing the source of human/bear conflicts through methods such as removing artificial food sources, citing offenders of "proper food storage" and "no feeding" regulations, closing trails, posting warning signs, distributing information to visitors, and in most cases, giving priority to the bear when there is a conflict. The policy specifically states, "Any area may be closed to human use and/or specific types of visitor activities for the purpose of human safety and/or where the impact of man has demonstrated adverse effect on the bear population or bear habitat. In this regard, campground opening and closing dates will be manipulated to provide for human safety. Where the potential for human/bear conflicts is extreme during the on-going visitor use season, areas will be closed by posting. Use of campgrounds located in or adjacent to areas of high grizzly bear density may be restricted at times to hard-sided trailer units, pickup campers, and self-contained recreation vehicle use only," and "No bear is to be destroyed for exhibiting its natural behavior– such as the defense of natural food sources or its young."

In addition, the following actions are currently being implemented specifically in the Lake and Bridge Bay developed areas and are considered part of the environmental baseline. These actions will continue.

Education efforts - are directed towards all employees working in the area. Orientation sessions are provided to NPS and concession employees and to contractors. Also the NPS works closely with supervisors of area employees to ensure compliance with bear closures or other bear management regulations.

Educational efforts are directed toward visitors through special brochures and at visitor centers, Hotel Lobbies and ranger stations. Informational signs are posted on trails in the Lake, Bridge Bay, and Natural Bridge areas.

Human Use-based actions -

- All spawning streams around Yellowstone Lake including those in and near the Lake and Bridge Bay developments, are closed to public entry during the entire spawning season and afterward when warranted by bear activity.

- Hiking and/or biking trails between the Fishing Bridge and Lake areas and between the Lake and Bridge Bay areas as well as the Natural Bridge trail, are closed for the duration of spawning season. After spawning season, these areas are open to visitor use, but may be closed at any time if deemed necessary due to bear activity on the trail(s).

- All closed areas are posted and/or blocked by a physical barrier across the common points of entry. These areas will be marked by signs indicating "Bear Management Area" during spawning season.

- At all locations where food is commercially prepared or served and at the Hamilton stores at Lake and Bridge Bay bear-proof food and garbage storage facilities are provided. At all other residential and overnight lodging areas bear-proof garbage containers are provided.

- The Sand Point picnic area and beach is closed when bear activity warrants.

- Throughout the Lake, Bridge Bay, and Fishing Bridge areas, late-night patrols will be continued and, when necessary due to bear activity, special patrols will be implemented.

- personnel are assigned to conduct spawning surveys, monitor bear activity, assist with crowd control, implement other bear management actions, as necessary.

As stated in the DCP, based on population monitoring in relation to ecosystemwide goals, overall trends in grizzly bear production and survivorship appear positive in the short-term. The number of sightings of females with young have increased in recent years. However, this increase may, in part, be due to increases in survey efforts, or increased effectiveness of survey methods or sightability. In addition, the past several years have been very good years in terms of natural bear food production/availability, resulting in younger age classes of bears accustomed to fairly good food availability. Years of poorer food production may cause bears to search widely for food. Broader foraging may bring them into closer contact with humans, increasing bear-human conflicts and potentially resulting in more control/management actions. Thus, at this time, current trends must be viewed with caution. In addition, despite considerable monitoring and analysis, the long-term viability of the Yellowstone grizzly bear population has not been proven (Mattson and Knight 1991). In fact, recent analysis suggests that, in view of existing demographic constraints and uncertainty over future habitat conditions and grizzly mortality rates, there is little reason for optimism regarding long-term viability/persistence of the Yellowstone grizzly bear population (Dennis et al. 1991, Mattson and Knight 1991, Mattson and Reid 1991, Mattson et al. 1992). Long-term survival of the Yellowstone grizzly bear population, over the next 100-200 years is contingent upon minimizing average annual mortality within the total population and especially that of adult females (Knight and Eberhardt 1984, 1985).

The current six-year average annual, known, human-caused mortality in the Yellowstone Ecosystem is five bears per year, with an annual, known, human-caused female mortality of 1.3 bears per year. Based on a conservative approach allowing for population recovery, the maximum allowable known, human-caused mortality for the Yellowstone ecosystem population is set at four percent of the most recent three year average population size, of which no more than 30 percent may be female. Applying this four percent figure to the 1991 minimum population estimate yields 228 x 0.04 or 9 bears (or 2 female bears) that could theoretically be taken each year without population decline. Thus, human-caused grizzly bear mortality appears to be within sustainable levels at the present time.

Grizzly Bear Use of the Lake Area

Throughout much of their habitat, after den emergence, grizzly bears move to restricted spring ranges where they feed heavily on succulent herbaceous plant material, carrion, weakened animals, and, in the case of the area surrounding Yellowstone Lake, spawning cutthroat trout. Upon emergence from the den, bears may be 25-40 percent lighter in body weight, depending on their age and reproductive condition, than the previous fall (Folk et al. 1977, Kingsely et al. 1980). It is during this critical period that they require areas where they can feed undisturbed in order to meet their nutritional requirements. By early July, alternate foraging areas become available and disturbance and displacement become less critical to the bears' survival.

Grizzly bears inhabit or range throughout the vicinity of the Lake/Bridge Bay Developed Areas, utilizing the spawning streams and surrounding habitat during the Yellowstone cutthroat trout spawning run, which generally begins mid-May to mid-June and lasts through July to August depending on the year. Exact timing of spawning is dependant on numerous factors including weather and snowmelt conditions. The highest levels of bear activity and streamside habitat use occurred one to two weeks after the peak in spawning (Reinhart and Mattson 1990) However, with the exception of radio-collared bears, movements are uncertain and bears may use the streams and lake shore area at any time. Studies conducted from 1985 through the present indicate that cutthroat trout spawn in at least 10 of the 15 streams flowing into Yellowstone Lake from Fishing Bridge to Sand Point (Reinhart 1990, FWS 1990, 1991). All of these streams have shown evidence of associated bear activity. In fact, increased bear use of spawning cutthroat has been documented in recent studies, possibly due to a combination of factors including recovery of fish populations in the lake system. In Reinhart's work from 1985 to 1987, 95 percent of cutthroat trout spawning streams tributary to Yellowstone Lake had evidence of bear activity and 61 percent had conclusive evidence of bear fishing. This is a significant increase over that found in studies by Hoskins (1974,1975) where bear use was recorded on 28 percent of the streams and bear fishing on only 18 percent.

Levels of bear use on spawning streams appears strongly related to fish density with bear activity beginning with the onset of spawning, highest near the peak of spawning or just after that, and continuing for one to two weeks after spawning has ceased. Based on tracks and other sign located during spawning surveys, the following minimum number of bears were known to be using spawning streams in the Lake/Bridge Bay Area:

1989 - 3-4 grizzly bears and one black bear;
1990 - 6-7 grizzly bears and one unidentified bear
1991 - 9 grizzly bears and two unidentified bears

Studies have also shown that bear use of front-country spawning streams was significantly affected by developed areas and the associated human presence (Reinhart 1990, Reinhart and Mattson 1990). Very little use of streams less than 1 km from park developments was recorded, though the amount varied somewhat due to timing of spawning runs relative to opening of major park developments. During 1986, when the spawning run coincided with heavy human use, bear use of streams less than one kilometer (km) from developments was 90 percent less than expected/predicted based on existing fish densities. During 1987, when spawning occurred before opening of major developments bear use of streams close to developments was 30 percent less than expected. The magnitude of potential impact is better illustrated by the fact that 35 percent of the cutthroat spawning streams tributary to Yellowstone Lake occur in the front-country with 18 percent of all spawning streams (three spawning streams at Grant Village and four streams at Lake) within one km of park concessions (Reinhart 1990).

EFFECTS OF THE ACTION

"Effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. **"Action area"** is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action . . . (50 CFR Part 402).

Results/impacts associated with development:

The best biological information available on potential results of development and impacts to grizzlies is discussed and summarized in the Grizzly Bear Compendium (National Wildlife Federation, 1987) and may be categorized as follows:

1. Direct loss of habitat due to activities that adversely modify or destroy important habitat components;
2. Increased access into grizzly bear habitat with the resultant increased human presence and activity;
3. Increased availability of attractants;
4. Indirect loss of habitat due to displacement or disruption of normal behavior patterns and habitat use;
5. Increased mortality risk: **direct mortality** due to control or management actions, road kills, illegal kills;

   indirect mortality - due to habituation of grizzly bears to human activities or food attractants predisposing them to nuisance behavior elsewhere, increased intraspecific interaction between bears;
6. Cumulative impacts of all past and present Federal, State and private actions;

1. Loss of Habitat Due to Activities that Adversely Modify or Destroy Important Habitat Components

The Lake area is already an established development. As part of the analysis completed for removal of some recreational facilities and development at Fishing Bridge in 1985, the habitat effectiveness for the Firehole/Hayden BMU, which contains the Lake/Bridge Bay areas, was calculated. At that time it was estimated that the habitat effectiveness in this subunit had already been reduced by 18.4 percent due to the existing developments. In an effort to minimize loss of grizzly bear habitat effectiveness, every effort was made to place new development proposed in the DCP "within the existing zone of influence" of already disturbed areas. Approximately 14 new acres of habitat will be directly impacted by new development in the area. The majority of disturbance is well within established developed zones.

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As mentioned above, until the CEM can be fully implemented to more accurately quantify what the current environmental baseline is in terms relative to the bear and what effects specific actions may have, the Park's goal is to minimize loss of grizzly bear habitat effectiveness. Based on this premise, the NPS has proposed to rehabilitate and restore both the Otter Creek administrative area, near the north end of Hayden Valley, and in the long-term the Little Thumb Creek area. These actions will return approximately 3.5 acres and 11.5 acres, respectively, of high-quality habitat to the grizzly bear in the bear management unit which also encompasses the Lake/Bridge Bay areas. As stated in the DCP, "Little Thumb Creek is a cutthroat trout spawning stream that has spawning fish in its undisturbed lower segment and experiences grizzly bear fishing activity. Restoration of the stream channel and surrounding disturbed area, combined with elimination of administrative access, will return this high-value area to grizzly bears. It is anticipated that restoration of the stream corridor will start within two to three years." (NPS 1992a).

Restoration of the above mentioned sites will have substantially greater value to the grizzly bear than the amount of peripheral habitat to be impacted by expansion of the Lake Developed Area. We, therefore, fully support and place high priority on all efforts to rehabilitate these areas. It is our opinion that the magnitude of direct habitat loss through physical alteration/destruction of habitat involved with the DCP is minimal and not at a level that is expected to impact the grizzly population. In fact, with implementation of the above outlined restoration activities, an equal amount of acres with substantially greater habitat value to the bear will be provided.

2. & 3. Increased access into grizzly bear habitat/Increased availability of attractants;

In their study of the effects of access on human-caused mortality of Yellowstone grizzly bears, Mattson and Knight (1991) revealed that mortality rates associated with all levels of access (roads, developments, and back country) have decreased over time. They point out that most of this observed improvement is due to better management/removal of attractants such as garbage and other edibles that have been a major cause of bear deaths in the past; and that these may have been the easiest reductions to achieve. In contrast, mortality rates associated with major developments have been relatively unresponsive to management efforts over the last 16 years and remain the most lethal to bears with roughly 11 times the mortality rate of other areas of the ecosystem. While progress has been made, in view of the threatened status of the bear, further efforts to reduce mortality levels are warranted in the remaining problem areas.

To this end, the NPS will continue implementation of actions outlined in their current bear management policy as well as the additional measures listed on pages 3 & 4 of this document to reduce bear/human conflicts and availability of attractants. We believe these actions, if implemented, should be sufficient to preclude the likelihood of jeopardy to the grizzly population. However, the conservation recommendations outlined on pages 10 & 11 list additional measures and steps that may be implemented in an attempt to further reduce mortality and further recovery of the bear.

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4. & 5. Indirect loss of habitat /Increased Mortality Risks/Habituation

Knight and Jonkel (1979) specifically list commercial developments as a source of conflict leading to unnatural grizzly mortality and, to ensure stable or increasing bear populations, recommend against such developments in bear management areas. Mattson et al. (1986) calculated the effects of human activity associated with primary roads and developments on grizzly bears in Yellowstone National Park. Habitat production sufficient to have supported three to four adult females was estimated to have been lost due to the effects of roads and developments. The results of Mattson et. al. (1986) indicate that grizzly occupancy of proximal habitat was reduced, efficient foraging strategies were disrupted, subadults were displaced towards roads and developments by more dominant bears, and the 0-to-1.86-mile zone surrounding developments was an area of extremely high mortality risk to adult females. Mattson and Knight (1991) point out that as expected, most of the mortality around developments resulted from lethal resolution of bear-human conflicts by management agencies.

The Lake/Bridge Bay areas are established developments built in an area latticed with spawning streams and lush riparian corridors now recognized as prime grizzly bear habitat components. Additional development in these areas is in part being proposed to "allow" sensitive wildlife areas around the lake outlet (Fishing Bridge) to be restored as well as to avoid establishment of new developments in previously undisturbed habitat.

As a result of the juxtapositioning of significant human activity on top of a lake shore complex of spawning streams and bear use areas, the Lake/Bridge Bay area continues to have the highest incidence of bear management actions and removals in the Park. The DCP outlines measures to address the conflict between temporal overlap of bear use of spawning streams and the opening of visitor facilities/concessions by changing opening dates and closing or restricting access to certain areas. These measures will reduce but not eliminate all adverse impacts to grizzly bears.

As stated in the DCP, the current existing situation at Lake/Bridge Bay results in a loss of bears from the ecosystem (often subadults and females). The number of control actions and bears removed from the Park has remained fairly constant over the past several years, with on average, one grizzly bear removed from the Park every year. The Lake area accounts for roughly 50 percent of all control actions and management removals in the Park or roughly 0.6 bears per year. During the period of 1981 to 1990, 25 trappings and translocations were implemented in the Lake subdistrict and a total of six grizzly bears (four males and two females) were removed. In view of the trend toward increasing bear use of spawning streams, coupled with increases in the number of facilities and thus human use in the same area, there is the potential for increased bear/human conflicts and bear losses in this area. Though the NPS plans to implement additional actions to minimize bear-human conflicts, should an increase in conflicts or mortalities occur, reinitiation of consultation with the FWS will be required to reexamine at measures of reducing impacts to bears.

A bear habituates to other bears, humans, or situations when such interaction gives it a return in resources, such as food, that outweighs the cost of the stress that precedes habituation (e.g., dump

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sites, spawning streams, etc.). Similarly, bears may habituate to people when such interaction results in access to a source of natural food in the vicinity of human use areas (McArthur-Jope 1980).

Studies indicate that areas near major developments may serve as temporary refuges for subordinate (subadult males) or security conscious bears (often females with young) seeking to avoid adult males (who prefer to use backcountry areas (Mattson et al. 1987)). As these bears are displaced by adult males into habitats closer to human habitation, they may initially try foraging during hours when humans are not present, but out of necessity may be forced to gradually habituate to humans. High quality foods often occur around developed areas, as in the case of the Lake spawning streams, serving as an added incentive to draw bears into the area.

Subadult males and adult females thus often become disproportionately habituated to humans, not as the result of using human foods, but as a result of using natural foods near humans (Mattson et al. in prep.). In addition, avoidance of humans and developed areas, may serve to place additional stress on the already marginal nutritional condition of adult females. This could result in poorer condition females and higher mortality rates and lower fecundity rates for the population as a whole (Reinhart 1990, Mattson et al. 1987). This more recent mortality risk seen around developments, associated with human-habituation rather than food conditioning will not be as easily removed as garbage attractants, for it is human presence alone that is the causative factor. Recent studies (Mattson et al. 1992) indicate that human-habituated bears and food-conditioned bears are 2.9 times more likely to range within 4 km of developed areas and 3.1 times more likely to be killed by humans than non-habituated bears.

Minimizing contact between grizzly bears and humans appears to be the best way of minimizing mortality risk to the Yellowstone grizzly population (Mattson and Knight 1991). Eliminating or reducing the level of human use in key foraging areas when grizzlies are utilizing them appears to be a positive measure that will minimize or prevent habituation to people and the subsequent people/bear conflicts which often result in the bear being removed from the population. If human use and development within occupied grizzly habitat is not reduced/minimized, management techniques to preserve habituated bears and manage associated risks to humans must be developed (Mattson et al. 1992).

As stated above, the current six-year average annual, known, human-caused mortality in the Yellowstone Ecosystem is five bears, with an annual, known, human-caused female mortality of 1.3 bears. According to the Grizzly Bear Recovery Plan, in order to facilitate recovery of the population a conservative approach is taken toward allowable mortality, accounting for error in both minimum population estimates and unknown, unreported mortality. Studies by Harris (1984) indicate that a grizzly bear population can sustain an average annual human-caused mortality of six percent without experiencing a decline. Based on a conservative approach allowing for population recovery, the maximum allowable known, human-caused mortality for the Yellowstone ecosystem population is set a four percent of the most recent three year average population size, of which no more than 30 percent may be female. Applying this four percent figure to the 1991 minimum population estimate yields 228 x 0.04 or 9 bears (30 percent of which would be 2 females) that could theoretically be taken each year without population decline. Thus, human-caused grizzly bear mortality appears to be within sustainable levels at the present time. We believe mortality risks can be held to current levels based on NPS commitments that: (1) spawning streams will be closed to public entry during periods of bear use; (2) areas of bear travel routes/corridors will be closed for the duration of the spawning season; (3) food storage and handling restrictions will be strictly enforced; and (4) bear patrols and monitoring of bears and humans will occur for the duration of the visitor season. Therefore, we conclude that the mortality level will be sufficiently managed with implementation of the proposed project to preclude the likelihood of jeopardy to the species. If new information becomes available in the future to show that human-caused mortality has increased or needs to be further reduced, consultation must be reinitiated.

The NPS attempted to evaluate the impacts to the grizzly bear within the immediate zone of influence of the project based on changes in habitat effectiveness and human-caused mortalities (See Appendix C). The mortality submodel was used to predict and compare expected grizzly bear mortalities under different management strategies for the Lake Lodge cabins and Bridge Bay campground. Though the model gives only comparative values for the different management strategies it is clear that delaying the opening of more Lake Lodge cabins longer would be of benefit to the bear. Certainly, keeping 25 percent of the cabins closed until after spawning and bear activity ceases will have some benefit depending on the timing of the spawning run, but not nearly as much as closing all of the Lake Lodge Cabins until after bear use of spawning streams ceases. While we do not believe closure of the Lake Lodge cabins until July 1 is needed to offset the likelihood of jeopardy to the grizzly population, it would be a positive step/attempt toward further reduction of human-bear conflicts and potential human injuries as well as bear habituation, management actions, and bear mortalities.

In addition to ongoing actions and those outlined in the current DCP, the National Park Service proposes to implement additional management actions (listed on pages 3 & 4) to offset or minimize impacts to grizzly bears (displacement, potential habituation, and the eventual removal of grizzly bears utilizing spawning stream habitat) from replacement and construction of facilities at Lake Developed Area. These were outlined in, " Actions to Reduce or Eliminate Adverse Impacts to Threatened/Endangered Species," in a July 13, 1992 letter from the NPS to FWS (NPS 1992b), and will be incorporated into the final development plan. While some actions will be implemented immediately, other actions will be phased in over time, and some were not included in the Lake DCP cost figures and will require additional funding sources/requests (NPS 1992).

We believe that implementation of these management actions should reduce impacts caused by increased human access and potential availability of attractants. Our not likely to jeopardize conclusion is based on implementation of these actions. However, based on past experience, activities may not occur in a timely fashion without guaranteed funding and all NPS proposed actions should be included in the project costs up front. This would include long-term funding to allow for adequate personnel to conduct night-time bear patrols, spawning surveys, bear monitoring, as well as improved sanitation, removal of Lake Lodge Cabins and all other proposed actions to reduce impacts to bears.

6. Cumulative impacts of all future State and private actions;

Regulations governing interagency cooperation under the ESA define **"cumulative effects"** as the effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR Part 402). Cumulative effects are added to the environmental baseline, which consists of past and present or ongoing activities in the action area as well as Federal activities already consulted on. Future Federal actions, including federally permitted actions, are subject to the Section 7 consultation requirements and, therefore, are not considered unless interrelated with or interdependent to the proposed action. Thus, the cumulative effects definition under the ESA is more restrictive than the definition under the National Environmental Policy Act.

The Federal action under consideration in this consultation is the proposed Lake/Bridge Bay Development Concept Plan that will allow for development and relocation of Park Service, concessioner, and visitor facilities in the Lake and Bridge Bay Developed Areas within Yellowstone National Park, primarily within existing disturbed areas. Any additional activities in the action area would be within and under the purview of Yellowstone National Park, and would thus be a Federal action subject to separate consultation. Therefore, there are no foreseeable State or private actions within the project area.

Fish Hatchery Historic District exhibit - This portion of the proposal will be addressed in a separate assessment and internal Fish and Wildlife Service Section 7 consultation as it deals with a FWS proposal for the Historic Hatchery District.

INCIDENTAL TAKE

Sections 4(d) and 9 of the ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of the incidental take statement. The measures described below are nondiscretionary, and must be implemented by the agency in order for the exemption in Section 7(o)(2)) to apply. The Federal agency has a continuing duty to regulate the activity that is covered buy this incidental take statement.

We anticipate that operation and expansion of facilities in the Lake/Bridge Bay Developed Areas will continue to require grizzly bear management actions. However, our not likely to jeopardize opinion is based, in part, on the fact that with implementation of the management stipulations and measures proposed by the NPS, the number of management actions (trapping & translocation or removals) in the Lake/Bridge Bay area is not **expected to exceed current levels***. Thus, the anticipated level of incidental take for the grizzly bear as a result of implementing the Lake Development Concept Plan is zero. Accordingly, no incidental take is authorized. Thus, should the level of take exceed existing levels (incidental take occur)*, the NPS must reinitiate formal consultation with the FWS and provide the circumstances surrounding the take.

* Based on records of bear incidents occurring in the Lake area over the past ten-year period (1981-1990), 0.6 bears have been removed from the ecosystem each year and the level of bear trapping and translocation incidents has averaged 2.5 per year (NPS 1992). If this level is exceeded due to this Federal action, based on a three year running average (i.e. if the 3-year average of removals exceeds 0.6 bears per year or 2.5 trapping and translocation incidents per year), consultation must be reinitiated. Our conclusions that no incidental take is anticipated is based on implementation of the following measures (described in detail on pages 3 & 4) to limit impacts to the grizzly bear population:

- All spawning streams in the area will be closed to public entry during the entire spawning season and afterward when warranted by bear activity.

- Hiking and/or biking trails in the area will be closed for the duration of spawning season and there after at any time if deemed necessary due to bear activity on the trail(s).

- All closed areas will be posted and/or blocked by a physical barrier across the common points of entry.

- All food or edibles commercially prepared or served at Lake and Bridge Bay will be stored in bear-proof food and garbage storage facilities. At all other residential and overnight lodging areas use of bear-proof garbage containers will be required.

- Throughout the Lake, Bridge Bay, and Fishing Bridge areas, late-night patrols will be continued and, when necessary due to bear activity, special patrols will be implemented.

- A physical barrier (split-rail fence) will be established between the Lake Lodge cabins and Lodge Creek and barricades will be placed to block vehicle use of the road and discourage pedestrian traffic between the cabins and the spawning stream.

- The long-term plan for the Lake Lodge cabins is to consolidate them and locate them at least 100 yards away from Lodge Creek.

- Loops G, H, and I in the Bridge Bay campground will remain closed when spawning surveys indicate the presence of bears on adjacent streams during the spawning season. There will be no advanced reservation of campsites in these loops.

- The road to Natural Bridge will be closed to public motorized vehicle traffic and gated beyond Natural Bridge.

- Improved maintenance operations will be implemented at the Bridge Bay Transfer Station.

The illegal killing of grizzly bears, be it through poaching or "mistaken identity", is a violation of both State and Federal law. All other taking of grizzly bears must be done in compliance with the 50 CFR Sec. 17.40(b) and applicable State laws.

CONSERVATION RECOMMENDATIONS

Section 7 of ESA specifies two mandates for Federal agencies. Section 7(a)(2) mandates that Federal agencies not jeopardize the continued existence of endangered or threatened species or destroy or adversely modify their critical habitat. Section 7(a)(1) directs federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. The term conservation recommendations has been defined as suggestions of the FWS regarding discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.14(j)).

As discussed in the body of this opinion, we do not view the measures proposed in accordance with the Lake DCP as long-term solutions to the human-bear problems associated with Lake/Bridge Bay or any development. However, we also recognize that the NPS is faced with dual responsibility to conserve and manage the threatened grizzly bear and its habitat while also providing recreational opportunities for a growing human population, mandates that are often in conflict and extremely difficult to balance.

Clearly, data indicate that cutthroat spawning activity continues in the Lake area well into mid and late June, with bear use of spawning areas continuing into July and even August in some years. The DCP states that a NPS objective is to provide visitor facilities and services in such a way as to minimize encounters between bears and humans. To achieve this, the ultimate goal should be eliminating or reducing the level of human use in key foraging areas (spawning areas) when bears are using them. This is essential in order to minimize or prevent habituation to people and the subsequent bear/human conflicts that often result in removal of a bear from the population. If human use and development within occupied grizzly habitat is not likely to be reduced, management techniques to preserve habituated bears and manage associated risks to humans must be developed, or methods to increase wariness of habituated bears must be found (Mattson et al. 1992).

In view of the threatened status of the grizzly bear, we do not view any increases in the number of control actions or bear mortalities at Lake/Bridge Bay as acceptable. For this reason, if the existing level of "take" or trapping and translocation incidents is exceeded at Lake/Bridge Bay, reinitiation of consultation will be required in order to determine actions necessary to further

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reduce impacts to bears. Yellowstone National Park provides a large portion of the secure core habitat for the grizzly bear population, which is essential for conservation and recovery of the species. All impacts to this core population must be critically evaluated not merely to avoid jeopardy but to ensure "conservation" of the species. Yellowstone's grizzly bear population is clearly constrained by high densities of humans and human access (Mattson 1990, Mattson and Knight 1991). While the NPS has alternatives to where and how they operate Park facilities, the bears do not have many other places to go.

We appreciate that the NPS is seeking to meet its responsibilities to endangered species. With respect to implementation of the Lake Development Concept Plan including additional measures listed on pages 3 & 4, the FWS provides the following conservation recommendations. We believe that the NPS can help meet its Section 7(a)(1) responsibilities and further the survival and recovery of the grizzly bear by implementing the following:

1. Development of a baseline assessment of existing grizzly bear habitat effectiveness on a park-wide basis with evaluation through the Cumulative Effects Modeling and analysis process.

We recommend that the NPS utilize the cumulative effects analysis process and CEM to quantify existing impacts and habitat values relative to bears on a park-wide basis (ie. establish an environmental baseline that will then be periodically updated). This same analysis process should also be used to assess any proposed projects (and compare project alternatives) and address cumulative impacts. While the current DCP lists some of the ongoing and planned activities occurring in the ecosystem, it gives little analysis or quantification of the effects of these activities on habitat effectiveness in affected bear management units (BMUs). The Cumulative Effects Model (CEM) was developed as part of the process for evaluating potential effects on the grizzly bear in the Yellowstone Ecosystem. However, because of the need for incorporation of post-fire information and model validation, it is not available for use at this time.

The FWS believes the model and cumulative effects* analysis process represent the best tool for biologically evaluating cumulative impacts and comparing the effects of different alternatives. The FWS remains concerned with the level of current effects analysis used in evaluating both the environmental baseline and proposed projects within and outside the Park. The many projects currently proposed or in planning and the management decisions to be made in association with them will commit resources and set management direction affecting grizzly bear management and conservation over the long-term. Toward this end, the NPS has expressed its intent and willingness to use the cumulative effects analysis process and model on a more Park-wide/broader scope in the future. We commend the NPS on this commitment.

* **Cumulative effects** as used here refering to the specific analysis process and model means "combined or additive effects." This is different than "cumulative effects" in 50 CFR 402.02. The CEM would allow for quantification of individual effects of different land uses and activities on grizzly habitat in space and through time, and provides an analytical tool for evaluating alternative land use scenarios relative to grizzly bear recovery objectives. Composed of three

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distinct routines: habitat, disturbance, and mortality, the model predicts habitat effectiveness and mortality risk. It will provide a relative measure (quantified and graphic representation) of the habitat effectiveness and mortality risks (for bears) for the existing (environmental baseline) as well as potential land use situation (effects of the proposed project and cumulative effects as defined by NEPA and ESA). Thus, using the model, we can quantify what the value of the habitat is (to bears) in a particular area or BMU with the current level of activity and projects (environmental baseline), then add the effects of all aspects of the proposed project or effects of the different alternatives to see if they are acceptable. Any effects from foreseeable future state or private actions (ESA cumulative effects)can then also be added.

The existing juxtapositioning of human activity and bear-use in the Lake area, while not likely to cause jeopardy to the grizzly bear population, remains of concern. Ideally in view of the value of the habitat to bears, the best solution to reduce the number of bear losses would be removal of the Lake Development from prime grizzly habitat. Since this is not likely to occur, we recommend that the Park consider the following alternatives to reduce bear losses including:

2. Removal of the existing log housing structures adjacent to Hatchery Creek.

While reports address the number of control and management actions taken each year, there is no way to estimate the number of bears being habituated to humans. These bears may later leave and become problems in other locations, but the root of the problem was caused by placing humans and a natural food source in close association. This is likely occurring at Lake, especially in areas like Hatchery Creek where bears can and are more willing to come into close proximity to humans to utilize spawning streams under the protection of cover. **In an attempt to eliminate or reduce habituation of bears and reduce the potential for bear-human conflicts and possible human injury or mortality, we recommend the Park remove the existing log housing structures adjacent to Hatchery Creek.**

3. Closure of all or a greater portion of the Lake Lodge Cabins until spawning and associated bear use in the area has ceased and consolidation of these cabins as far from the stream and as soon as possible.

Similar recommendations to delay opening dates for Lake Lodge, the Lodge cabins and concession housing as well as the back loops of Bridge Bay campground and consolidation of employee housing away from spawning streams were made by a special Committee established under the Yellowstone Ecosystem Subcommittee of the Interagency Grizzly Bear Subcommittee. While we do not believe the delaying opening of these facilities until July 1 is currently necessary to offset the likelihood of jeopardy to the grizzly population, it would be a positive step toward further reduction of human-bear conflicts, potential human injuries, bear habituation, management actions, and bear mortalities. In doing so it would further survival and recovery of the species.

4. Evaluation of the benefits/ramifications of closing off all or certain spawning streams.

In view of the fact that bear-human conflicts will probably continue in the Lake area, it is our belief that the NPS should look seriously at long-term management alternatives for the Lake/Bridge Bay area. What actions are realistic in terms of management constraints, yet offer the biggest benefit to Yellowstone's grizzly bear population? Current management actions, including those proposed in the Lake DCP, should be evaluated to determine if they are, in fact, reducing bear-human conflicts and management actions. However, this will not give an accurate indication of the number of bears being habituated at developments such as Lake only to become problems in another location.

The option of blocking all or certain spawning streams or preventing bear access to such streams has been proposed in the past as a method of reducing potential of human injuries and death as well as reducing habituation and eventual removal of bears from the system. The Lake Development is in and adjacent to prime bear habitat and if no additional timing restrictions are to be placed on its operation, it has been suggested that it could be in the best interest of the grizzly bear population to block all or specific spawning streams running through the development (actual blockage of the runs, fencing out bears, etc.) to eliminate habituation and the eventual death of bears.

As Yellowstone bears tend to range widely and food is generally abundant in May and June, it is believed that the bears are not dependent on these streams for food. Regardless of dependency or availability of other foods, spawning streams are a known, traditional food source that would continue to be sought out by bears for four or five years after the runs are eliminated (Knight, 1979 pers. comm.). Potential for conflicts would also persist due to any unblocked streams and bear use of the area not related to the spring cutthroat run.

While the Service is **not** proposing this as a viable option at this time, we do believe it is an alternative that should be fully evaluated in terms of impacts to other species from blocking streams, implications to the grizzly bear population, methods of/or feasibility of blocking streams (actual blockage of the runs, fencing out bears), etc. Are the current benefits/gains realized by bears from feeding on the spawning streams (increases in survival and fecundity) sufficient to compensate for the losses incurred by the population as a result of associating with/habituation to humans? We believe the FWS, NPS, and researchers should work together to evaluate the impacts/benefits and overall feasibility of this management option or other alternatives toward enhancing grizzly bear survival and recovery.

Miscellaneous

Completion of planned "mitigations" associated with Fishing Bridge - The NPS has put considerable effort into completion of measures outlined in the Fishing Bridge opinion. However, some of the agreed to measures called for in the 1988 Fishing Bridge EIS and outlined as part of the 1987 biological opinion issued for the Fishing Bridge Development Concept Plan have not been completed, primarily due to problems in securing funding for such projects. An outline of these actions are contained in Appendix B. While we recognize that securing adequate funding as a very real problem, these projects were allowed to proceed based on commitments that proposed actions to reduce impacts to bears would be implemented. As you are aware, should any of these measures not be implemented, for whatever reason, it will be necessary to reinitiate consultation. However, the NPS has shown a good faith effort to compete the subject actions, and we are willing to work with the Park in seeing that all these measures are implemented. Once again we stress the need to include funding for conservation/mitigation measures up front in project funding, and the importance of completing "mitigation measures" in a timely manner. As part of meeting those obligations made during consultation on Fishing Bridge, we request that the NPS reevaluate the habitat unit gains and losses associated with closures actually implemented in Pelican Valley.

CONCLUSION

This concludes formal consultation on this action. As required by 50 CFR Sec. 402.16, reinitiation of formal consultation is required if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species of critical habitat that was not considered in this opinion (including not implementing the actions outlined on pages 3 & 4); (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations that are causing such take must be stopped in the interim period between the initiation and completion of the new consultation if any additional taking is likely to occur.

Your cooperation and assistance in meeting our joint responsibilities under the Endangered Species Act are appreciated.

Sincerely,

Charles P. Davis
State Supervisor
Wyoming State Office

cc: Assistant Regional Director, FWE, Denver, CO (FWE-60120)
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Nongame Coordinator, WGFD, Lander, WY

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Editor's Note: The appendixes for the biological opinion correspond to elements of this plan as follows: for appendix A, see the Lake — Development Concept Plan map (page 21) and the Bridge Bay — Development Concept Plan map (page 27); for appendix B, see "Appendix E: Status of Fishing Bridge Mitigating Measures," pages 57–59; and for appendix C, see "Appendix G: Effectiveness of Proposed Management Actions," page 83–89.

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APPENDIX G: EFFECTIVENESS OF PROPOSED MANAGEMENT ACTIONS
(Supplementary Information to the Biological Assessment)

The Lake / Bridge Bay *Development Concept Plan / Environmental Assessment* recognized that at this time, the cumulative effects model is not available to assess the relative merits of the alternatives presented in the plan. However, the rationale behind the cumulative effects model was used to make a qualitative biological assessment of the impacts related to the proposed action and alternatives for Lake and Bridge Bay. The model recognizes two key factors influencing the potential recovery of the grizzly bear population in the Yellowstone ecosystem. These factors are the effectiveness of the habitat available to grizzly bears (measured for each of 18 bear management units) and human-caused grizzly bear mortalities.

HUMAN ACTIVITIES AND BEAR USE IN THE LAKE/BRIDGE BAY AREA

The quality of food and the availability of cover are important in assessing the effectiveness of habitat for grizzly bears. Another important component is the effect of disturbance associated with human activities on grizzly bears' ability to use a specific habitat. Human activity may affect grizzly bears by displacing them from an area or a food source that might otherwise be used in the absence of human activity. The degree of displacement depends on the type, timing, and intensity of human activity. The zone of influence of a particular human activity or development can also be influenced by natural barriers. The zone of influence around any existing use or developed area is not a real line that affects bears in a uniform manner; rather the line fluctuates based on the season, the time and amount of human use, the quality and availability of bear foods at a specific time, and the nature of the bear(s) using the area. Data suggest that the park's major developed areas effectively displace bears from using those areas to the degree that would be expected if human activity was not present (Mattson 1990). This effect of human activity on bear use likely occurs to varying degrees in all areas of significant human occupation.

The park puts a priority on minimizing bear/human conflicts and favors the bear on the majority of park lands, which are designated as management situation 1. However, most of the major developed areas, including Lake/Bridge Bay, are designated as management situation 2. In management situation 2 management decisions will accommodate demonstrated grizzly bear populations and use if feasible, but not to the exclusion of other uses.

Data on bear use of spawning streams in 1985, 1986, and 1987 (Reinhart 1990) are displayed for Yellowstone Lake tributaries and for Lake area streams in figures G-1 and G-2. For all Yellowstone Lake spawning tributaries excluding east shore streams (which have later spawning runs on average), bear use in 1985, 1986, and 1987 began in early May, peaked from mid- to late-June, and was complete from mid- to late-July (figure G-1). By June 10, 30.65% of bear use of spawning streams was complete, by June 20, 50.59% was complete, and by June 30, 62.49% of bear use on those spawning streams was finished.

Streams in the Lake/Bridge Bay area showed a somewhat different pattern of bear use in 1986 and 1987 (figure G-2). Beginning and ending dates for both stream sets were similar. However, dates of peak bear use occurred in the Lake area streams from mid- to late-May, a month earlier than found for all west and south shore Yellowstone Lake tributaries. Bear use of Lake area streams dropped off dramatically between the end of May and the middle of June. Our interpretation of these data is that this likely occurred as a result of opening visitor facilities near the spawning streams, as we would expect displacement of bear activity attributed to human activity in the area. Research on bear use of cutthroat spawning streams in Yellowstone (Reinhart and Mattson 1990) has shown that when bears

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FIGURE G-1: BEAR USE OF SPAWNING STREAMS — YELLOWSTONE LAKE

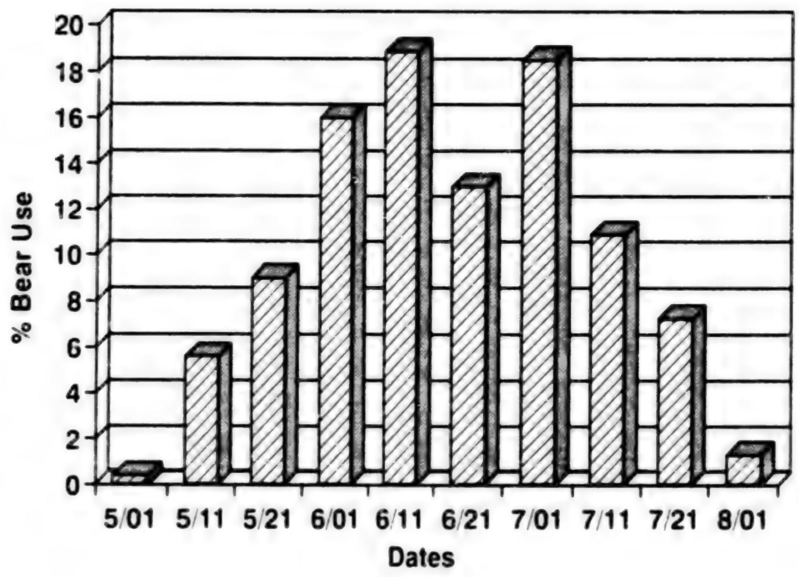
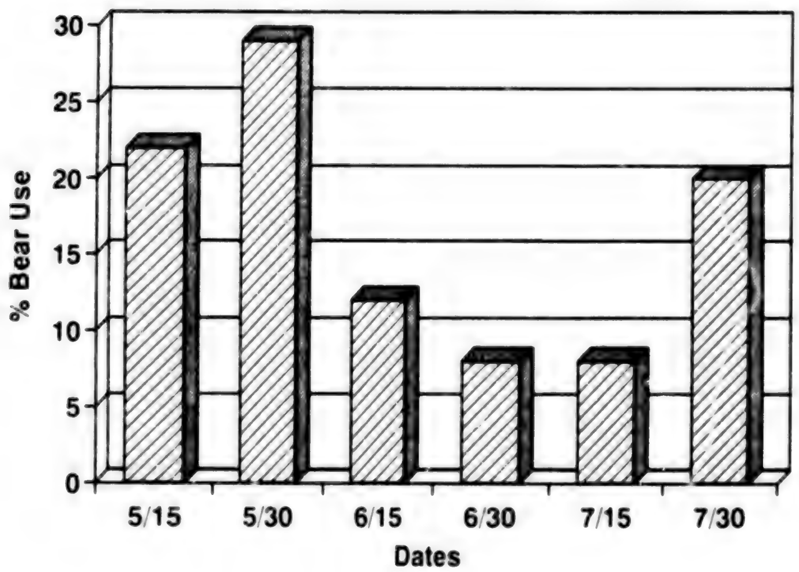


FIGURE G-2: BEAR USE OF SPAWNING STREAMS — LAKE AREA



use streams near human developments (hotels, stores, campgrounds), they are influenced by the presence of humans. Figures G-1 and G-2 illustrate this different pattern of bear use of spawning streams in developed areas compared to that of spawning streams where human disturbance is less a factor.

We cannot demonstrate that in the absence of human activities bears would exhibit the same pattern of use in Lake area streams as is seen in all lakeshore streams, although this is a reasonable hypothesis. However, the management strategy in the Lake/Bridge Bay developed area, as reflected in the description of grizzly bear management situation 2 habitat, is to balance resource conservation and human enjoyment. Consequently, the goal is not to eliminate all displacement of bears by humans, but to moderate those effects that may contribute to the continued listing of this threatened species while accommodating human use.

IMPACTS OF MANAGEMENT ACTIONS ON GRIZZLY BEAR MORTALITY

Analysis 1

The presence of grizzly bears in the Lake and Bridge Bay areas indicates that the developments do not completely displace bears from the area. Bears using the Lake and Bridge Bay habitats will continue to occasionally come into conflict with humans, which can potentially lead to bear mortalities.

The cumulative effects model contains a component designed to predict the effects that a development area has on bear mortality. The grizzly bear risk mortality submodel (Fishing Bridge *Final Environmental Impact Statement / Development Concept Plan* 1988) used the following equation to predict mortalities attributed to specific developments in the Lake/Bridge Bay area:

$$\text{TRAN} = ({}_e(-2.305 + 0.002510{*}\text{CAP} + 0.1410{*}\text{WALL} + 0.05532{*}\text{MALE}))$$

where: TRAN = predicted number of transfers over 10 years
CAP = number of lodging units
WALL = presence or absence of barriers
MALE = percentage of males in population

A primary predictor in this submodel is the number of lodging units in the specific area of analysis. Although the mortality submodel has been the subject of considerable discussion among scientists, it is one available tool that can be used to predict expected grizzly bear mortalities related to a specific development where humans stay overnight in the park. It is based on assumptions developed for the mortality submodel used in the *Final Environmental Impact Statement / Development Concept Plan* for Fishing Bridge, and the predicted outcome(s) should then be tested against observed results that occur if those actions are taken.

We used the submodel to predict the expected grizzly bear mortalities separately attributed to the Lake developed area and the Bridge Bay campground. Then we used the submodel to assess the value of our proposed management actions involving adjusted use dates in the Lake Lodge cabins area and Bridge Bay campground. The result is a prediction of decreased bear mortality attributed to adjusting the number of lodging units that are occupied by humans during the spawning season (see tables G-1 and G-2). For analysis purposes only, three opening dates (June 10, 20, and 30) were used, and various occupancy rates were analyzed for the Lake Lodge cabins (0%, 50%, 75%, and 100%), and Bridge Bay campsites (64% and 79%).

The baseline output of the mortality submodel is a predicted level (value not given here) of grizzly bear mortality attributable to the Lake developed area. The submodel assumes a use season of 133 days for the Lake Hotel (from 1992 data) and 105 days for the Lake Lodge and cabins. It assumes that all lodging units contribute equally to bear mortality, and that every day each unit is open contributes equally to bear mortality.

A delayed opening of the Lake Lodge cabins (but not the hotel) is predicted to result in a decline, but not an absence, of bear mortalities attributed to the Lake developed area. Table G-1 indicates that by delaying any occupancy of lodge cabins until June 30 there would be a predicted 45.6% decline in expected grizzly bear mortality in the Lake area. The remaining level of mortality would be attributed to occupancy of the Lake Hotel, which is a constant for all analyzed management options. By delaying occupancy of 25% of the lodge cabins until June 10, 20, or 30, the predicted bear mortality would decline 14.9%, 18.4%, and 22.8%, respectively.

The mortality risk submodel thus predicts that the proposed management action (to reduce occupancy of Lake Lodge cabins to approximately 75% of total available units until spawning and related bear activity ceases) would have varying value to bears, depending on the date that bear activity ceased.

The mortality risk submodel for the Bridge Bay area predicts a decline in bear deaths attributed to the campground. The management actions analyzed here are the temporal use adjustment in loop H, adjacent to Stream #1198 (Wells Creek), and in loops G, H, and I. The phased-in opening of campground loops G, H, and I has been undertaken in recent years and is proposed to continue. The predicted outcomes in table G-2 show a similar pattern of benefit to bears by temporally adjusting occupancy of the back loops of this campground.

The predicted *values* displayed in tables G-1 and G-2 are less important — and less reliable — than the obvious relationship shown: reducing temporal and spatial overlaps between bears and humans reduces mortality risk to bears. The maximum possible predicted benefit to bears would be achieved by complete reduction of human occupancy, but this also would maximize the negative effects on human use of the Lake and Bridge Bay developed areas.

TABLE G-1: PREDICTED DECREASES IN BEAR MORTALITY ATTRIBUTED TO VARYING OPENING DATES AND OCCUPANCY OF LAKE LODGE CABINS

Lake Lodge Cabins	100% Occupied	75% Occupied	50% Occupied	0% Occupied
Open — June 10	-4.4%	-14.9%	-24.6%	-40.3%
Open — June 20	-8.8%	-18.4%	-28.1%	-43.0%
Open — June 30	-12.3%	-22.8%	-30.7%	-45.6%

TABLE G-2: PREDICTED DECREASES IN BEAR MORTALITY ATTRIBUTED TO VARYING OPENING DATES AND OCCUPANCY OF BRIDGE BAY CAMPGROUND.

Bridge Bay Campground (438 sites)	100% Occupied	H Loop Delayed (79% occupied)	H, G, and I Loops Delayed (64% occupied)
Open — June 10	-17.6%	-33.8%	-43.2%
Open — June 20	-25.7%	-40.5%	-50.0%
Open — June 30	-35.1%	-47.3%	-55.4%

Analysis 2

The submodel as currently used does not incorporate data on bear use of spawning streams. Data indicate there is considerable year-to-year variation in the timing of spawning runs, related to the timing of spring runoff and the breakup of Yellowstone Lake. The logarithmic equation used in the mortality submodel does not take into account the temporal variability of bear use that occurs each year.

During years when the spawning season ends early, such as in 1992, the effect of opening facilities early in the season (approximately June 10) is much less disturbing to bears (which are less likely to be present) than during years when the spawning season continues into July (and bears are likely to be present in the area much longer). Therefore, a separate interpretation is that flexible opening dates benefit bears differently than the effect predicted by the mortality risk submodel, which assumes equal risk to bears on each day of the season. This interpretation suggests that reducing temporal overlap of bears and humans during spawning season would have equal value from year to year, regardless of when the spawning season occurs.

IMPACTS OF MANAGEMENT ACTIONS ON GRIZZLY BEAR HABITAT

In 1985 the habitat effectiveness of the subunit of the Firehole Hayden bear management unit, which includes the existing developments at Lake and Bridge Bay, was mapped for the cumulative effects assessment in the Fishing Bridge environmental impact statement and development concept plan. The habitat effectiveness was estimated to have already been reduced by an average of 18.4% due to existing human activities in the subunit. The proposed construction of RV spaces and housing units to replace and improve existing employee living conditions in the Lake area would increase the total amount of disturbed ground by approximately 14 acres. The absence of a working habitat submodel prevents us from quantifying the reduction in habitat effectiveness, if any, that would occur due to disturbing these 14 acres. These acres are within the zone of influence of existing human activity, and are already below their "pristine" habitat quality value. However, this expansion on the edge of currently disturbed ground also somewhat expands the zone of influence outward.

To help offset the loss of habitat effectiveness caused by the existing development and the proposed actions, the restoration of two sites in bear management units in or adjacent to the Firehole Hayden bear management unit are proposed. We believe these sites have a higher value to the grizzly bear population than do the acres proposed for expansion of housing in the Lake area. The Otter Creek administrative site, near Hayden Valley, would restore approximately 3.5 acres of habitat in an area of substantial contiguous and undisturbed acreage. The park's main loop road crosses through Hayden Valley, between Otter Creek and Mud Volcano; other than this long-established road corridor, there are no other usable service roads besides the Otter Creek site.

The park also proposes to restore and rehabilitate the Little Thumb Creek quarry and service road at the southern end of the Firehole/Hayden bear management unit. Historic activity in this administrative area has resulted in erosion, siltation, and de-watering of an otherwise highly productive spawning stream. Water remains in the lower portion of Little Thumb Creek during the cutthroat spawning season, and grizzly bears regularly use the creek each spring. Alteration of the stream channel near the old quarry forces fish and bears to stay in proximity to the main park road, as the stream currently lacks water less than 1/4 mile above the roadway.

Table G-3 shows the relative value of Little Thumb Creek compared to a sample of spawning streams in the Lake and Bridge Bay areas. Values are given for survey years 1986 and 1987 (Reinhart 1990); values include bear activity indices, bear fishing activity indices, and the sum of these two scores as total bear score. The values do not reflect actual numbers of bears using spawning streams.

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TABLE G-3: RELATIVE VALUES OF BEAR ACTIVITY ON SELECTED SPAWNING STREAMS, 1986–1987

Stream Name	Stream Number	Bear Activity 1986	Bear Activity 1987	Bear Fishing 1986	Bear Fishing 1987	Total Bear Score 1986	Total Bear Score 1987
Lodge Creek	1203	0.12	0.58	0	0.06	0.12	0.65
Hatchery Creek	1201	0.12	0.99	0	0.98	0.12	1.67
N. Incinerator Creek	1199	0	0.5	0	0.75	0	1.25
Wells Creek	1198	0	0.12	0	0.06	0	0.19
Bridge Creek	1197	0.12	1.02	0	0.28	0.12	1.3
Little Thumb Creek	1176	2.99	2.32	3.41	10.40	6.41	12.74

Of all Yellowstone Lake streams with a cutthroat spawning run and associated bear use, Little Thumb Creek displayed the highest levels of bear activity and bear fishing (Reinhart 1990). Restoration of this stream channel would provide fish with suitable spawning habitat farther up the stream, where bears would find more cover while fishing. A proposal has been made to reclaim the former service area with state mining reclamation funds. When accomplished, this would ultimately restore approximately 11.5 acres of grizzly bear habitat along a spawning stream in the same bear management unit affected by the Lake developed area.

Restoration of the above-mentioned areas will also reduce or potentially eliminate a corridor or site with its own zone of influence. The Otter Creek and Little Thumb administrative sites, once restored, will have no road or trail access. Roads and trails are described in the cumulative effects model as linear sources of human influence on grizzly bear use of an area. Removal of these corridors will restore not only the estimated acreage of the disturbance, but will eliminate all but off-trail nonmotorized displacement in the zone of influence surrounding each of these roads and service areas.

The proposed actions also include cessation of public vehicular traffic on approximately 2 miles of the Natural Bridge road and replacing it with a hiking/biking trail to be opened to the public only after spawning season ends each spring. This corridor of human activity lies within the same bear management unit as the Lake/Bridge Bay development. This action would result in reduced human displacement just south of the Bridge Bay developed area.

CONCLUSION

The lack of an available cumulative effects model limits our ability to quantitatively assess various management actions in relation to grizzly bear habitat quality and mortality. This addendum, in combination with the *Development Concept Plan / Environmental Assessment* for Lake/Bridge Bay, represents our best biological assessment as to the effects of the proposed actions (as revised) for the management of the Lake/Bridge Bay developed area. When the cumulative effects model becomes available, we anticipate using it to help us better analyze proposed management actions, in company with our biological assessments. We believe that the combined effects of management actions ongoing and proposed in this plan will not jeopardize the continued existence of the grizzly bear in the Yellowstone area.

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Reinhart, Daniel P., and David J. Mattson
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PLANNING TEAM

The development of the Lake Bridge Bay *Development Concept Plan* has taken more than 20 years During this time numerous NPS personnel have been involved Only the NPS personnel who finished the draft and final versions of the plan are listed here, this, however, by no means lessens the valuable contributions made by the many others who have worked on this plan over the years All those who have been involved in completing this plan appreciate the contributions and efforts made by all their predecessors and thank them for their work

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Kevin Brandt, former Management Assistant
Stu Coleman, Assistant Chief Ranger Resource Management
Sue Consolo Murphy, Resource Biologist
Kerry Gunther, Wildlife Biologist
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Dan Sholly, Chief Ranger
Cathy Smith, Cultural Resources Management Specialist
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Nancy Ward, Supervisory Environmental Engineer
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Christine Turk, Chief, Branch of Compliance Legislation

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Midwest Archeological Center

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Interagency Grizzly Bear Study Team

David J Mattson

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Ruth Eitel, Visual Information Specialist Denver Service Center
Greg Sorensen, Writer Editor, Denver Service Center
Janet Stickland, Visual Information Technician, Denver Service Center

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NPS D-489A April 1993

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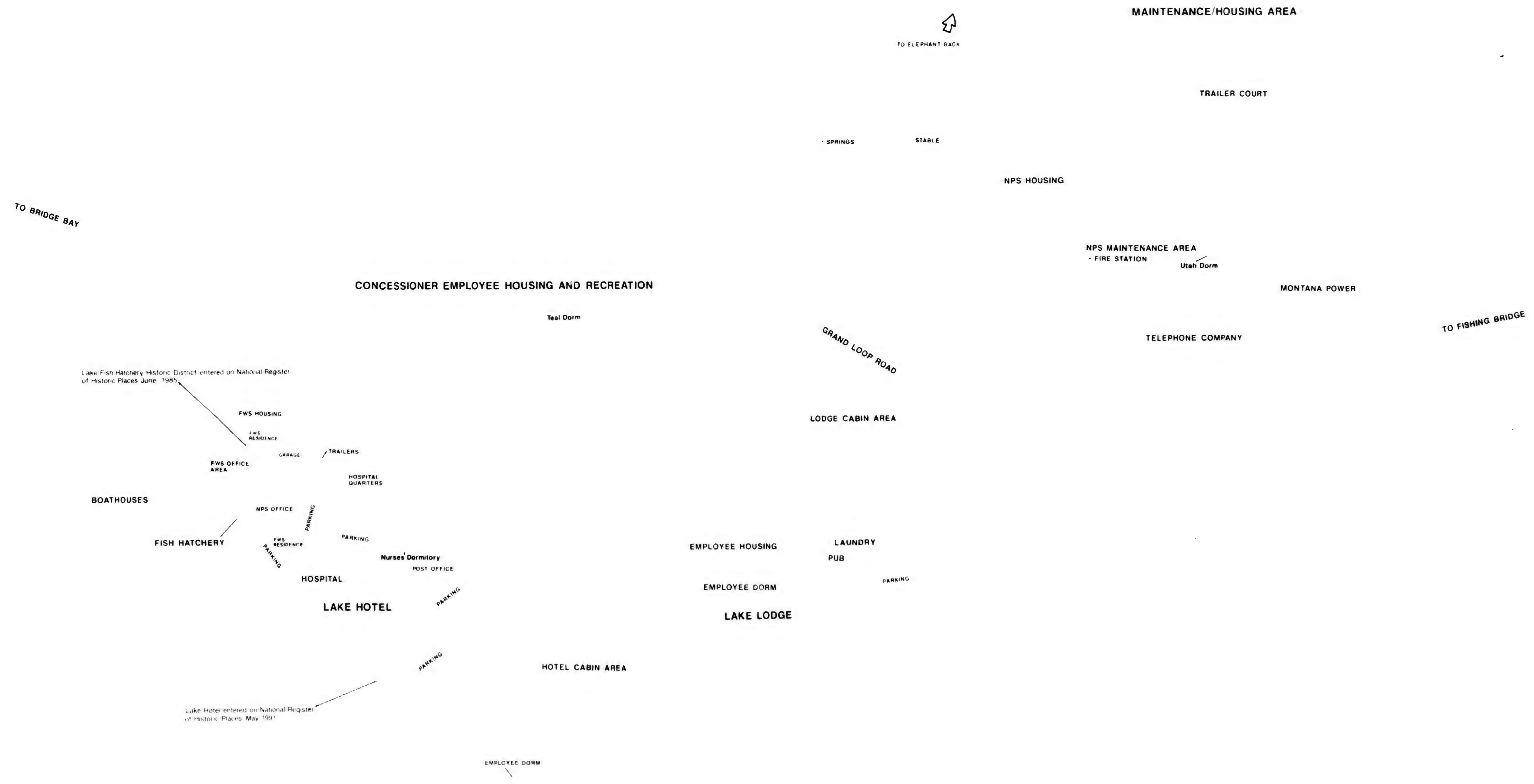
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CONCESSIONER EMPLOYEE HOUSING AND RECREATION
Teal Dorm
GRAND LOOP ROAD
TELEPHONE COMPANY
TO FISHING BRIDGE
Lake Fish Hatchery Historic District entered on National Register of Historic Places June 1985
FWS HOUSING
FWS RESIDENCE
GARAGE
TRAILERS
FWS OFFICE AREA
HOSPITAL QUARTERS
LODGE CABIN AREA
BOATHOUSES
NPS OFFICE
PARKING
FISH HATCHERY
FWS RESIDENCE
PARKING
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Nurses' Dormitory
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LAUNDRY
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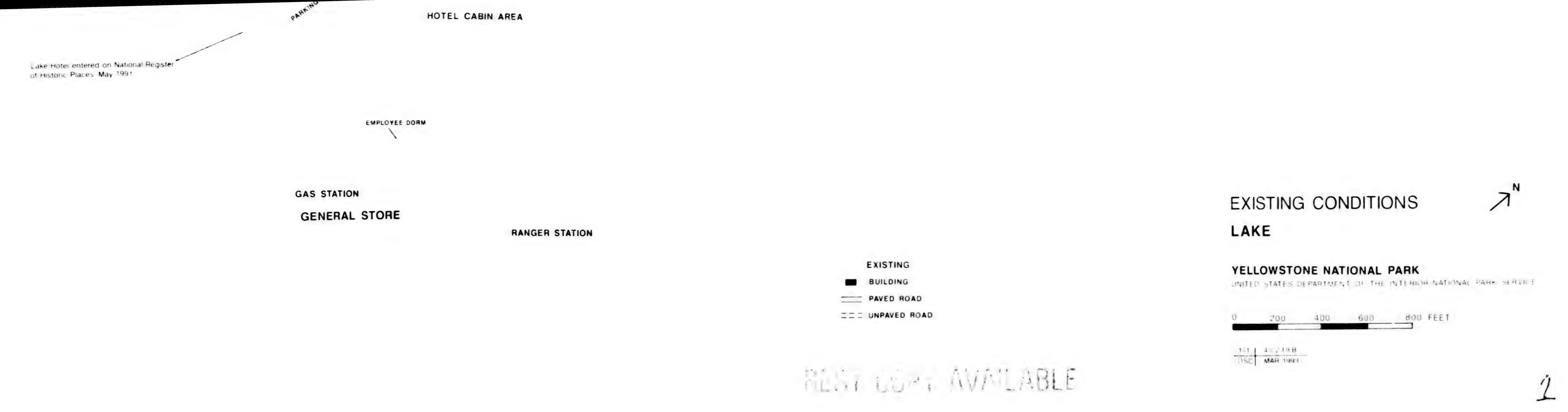

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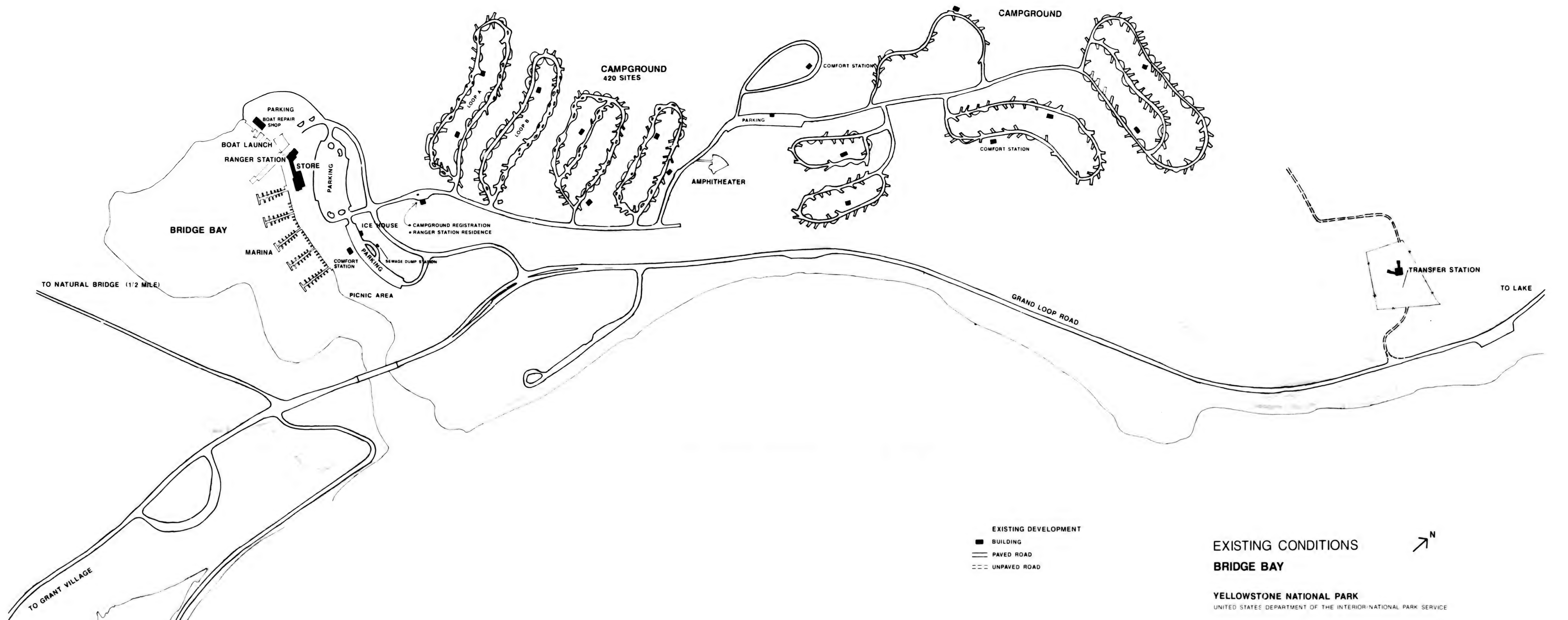

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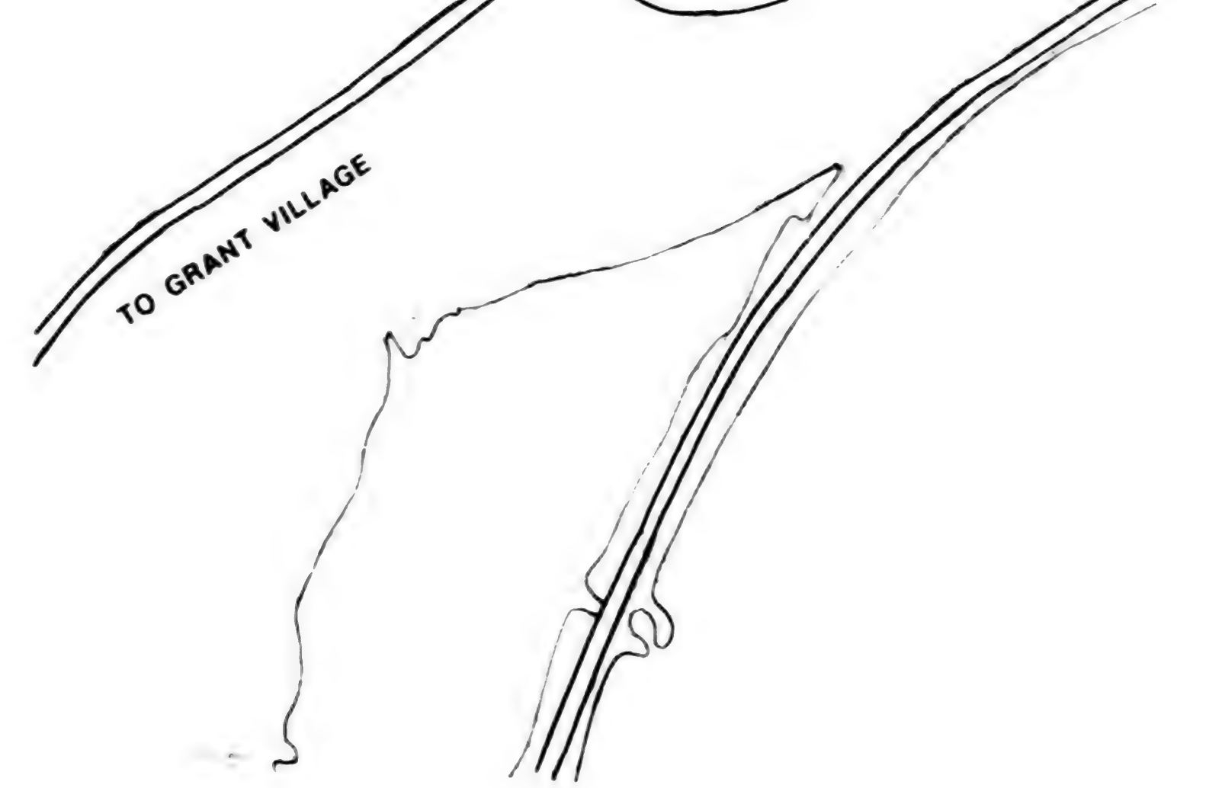

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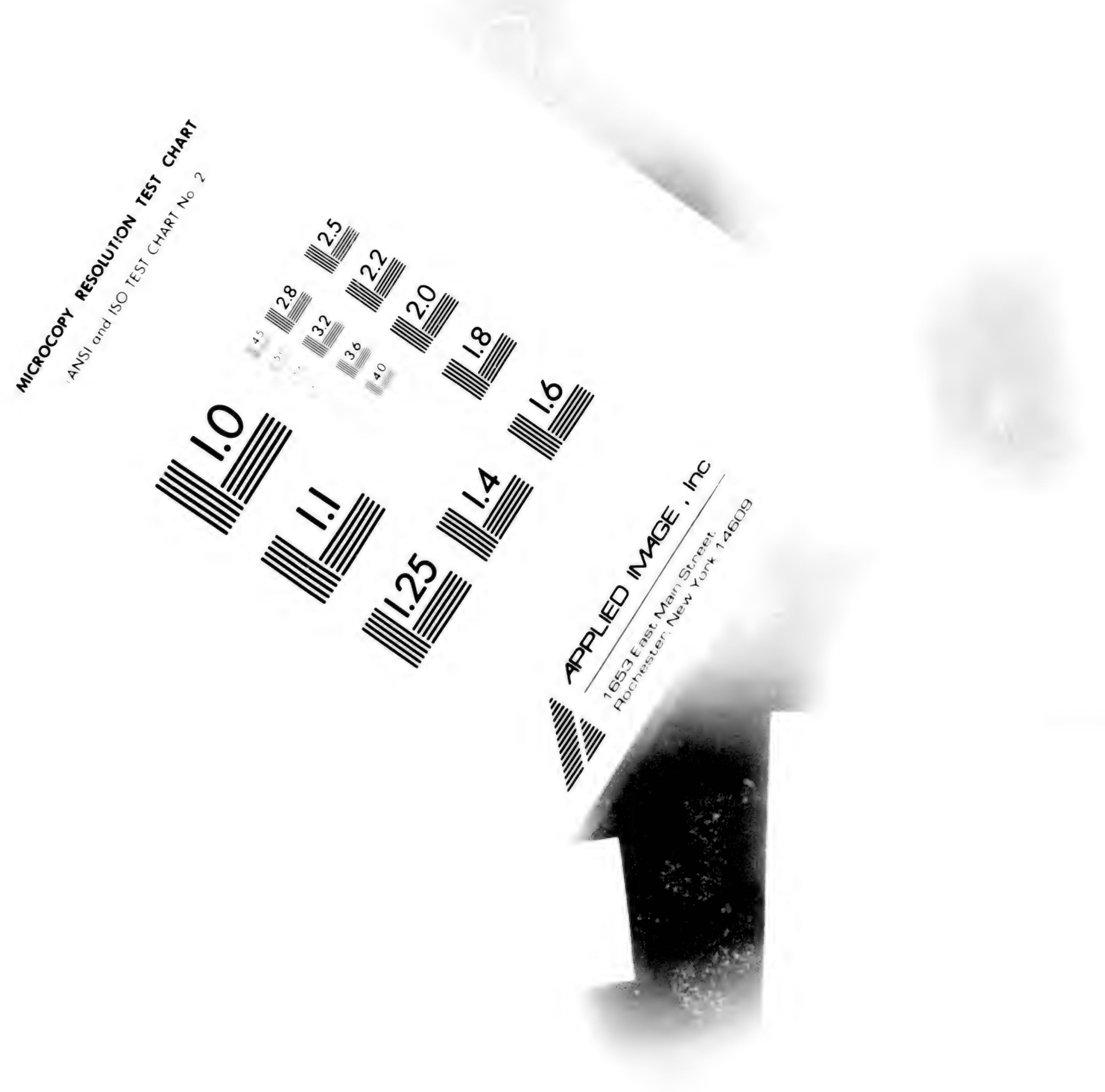
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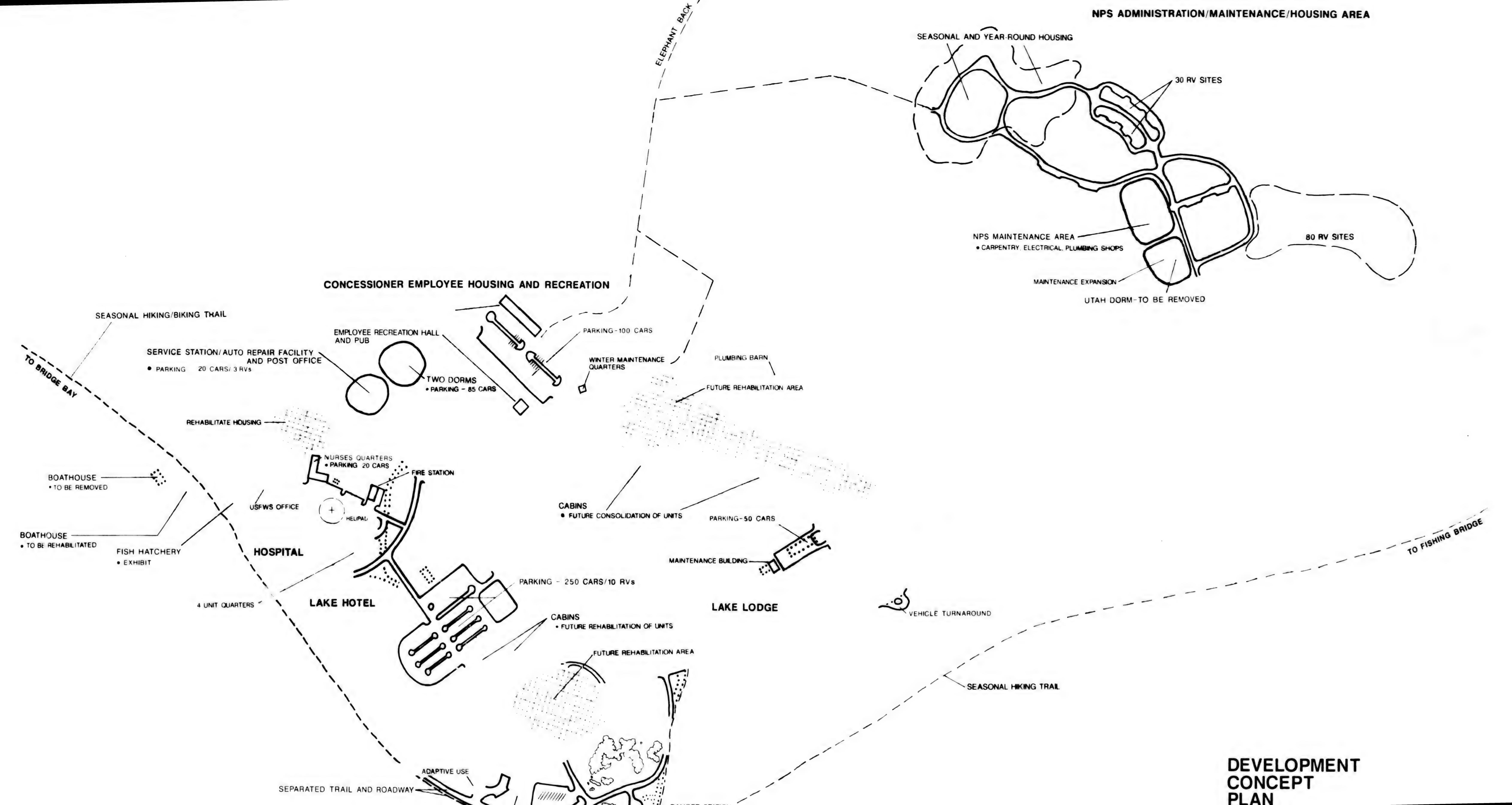

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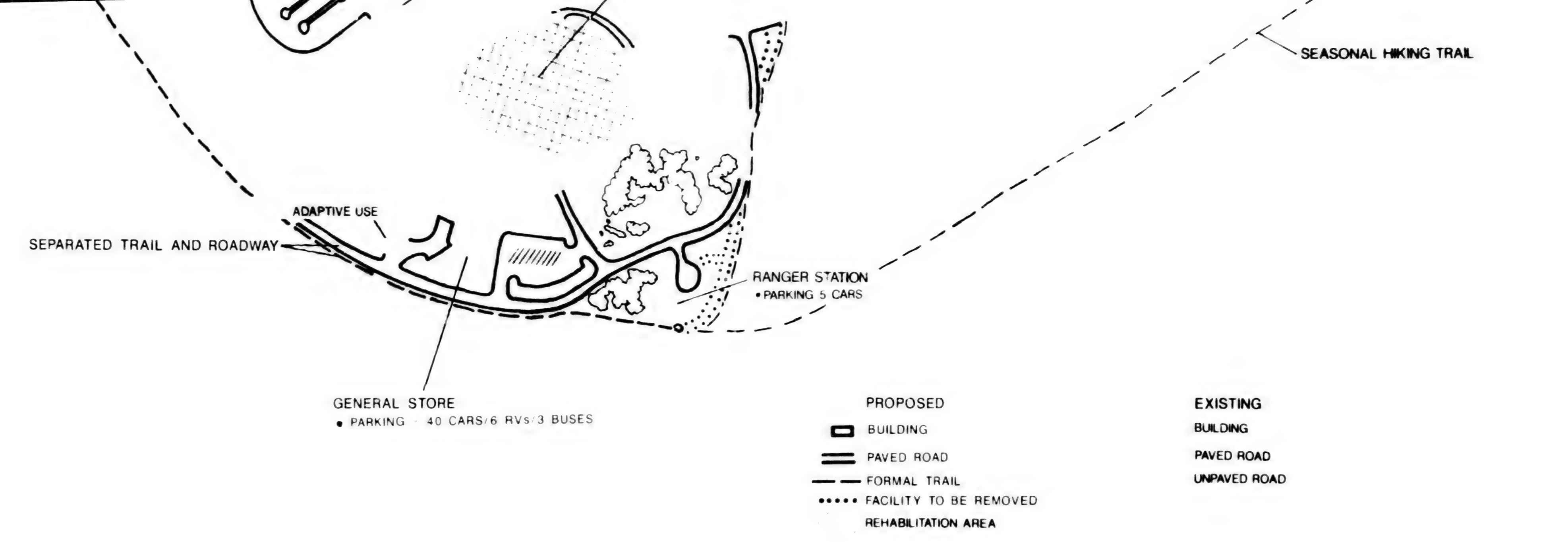

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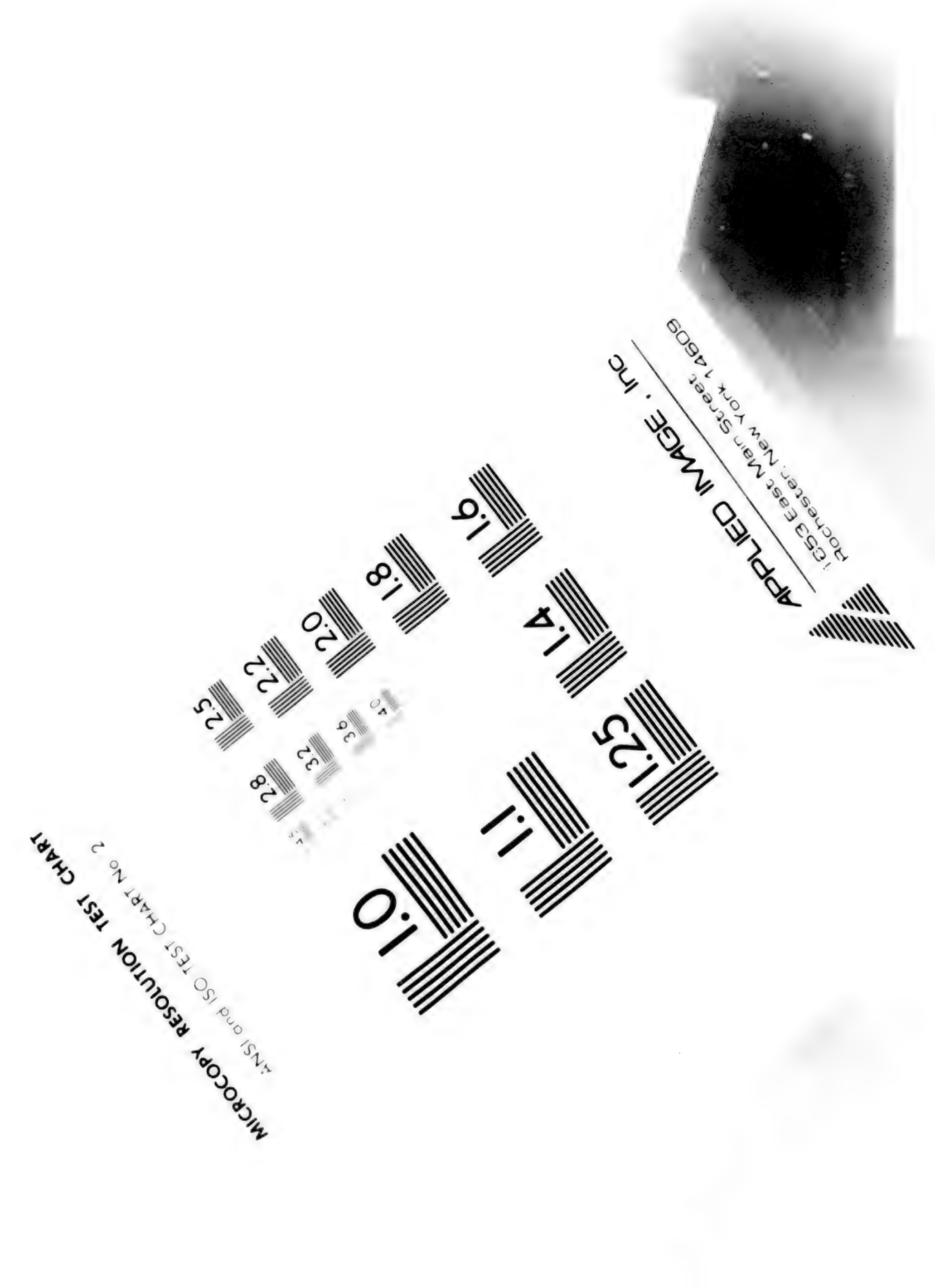

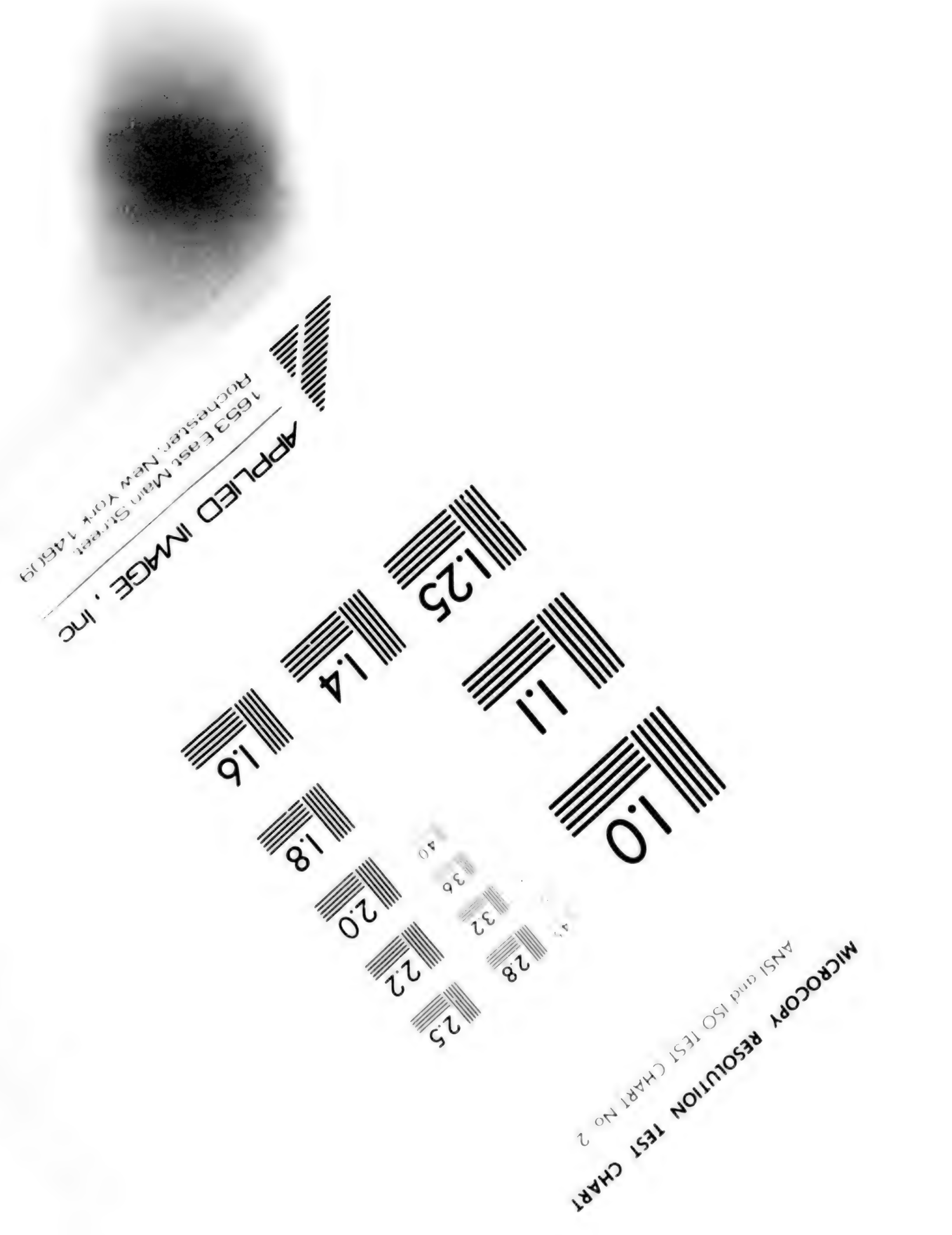

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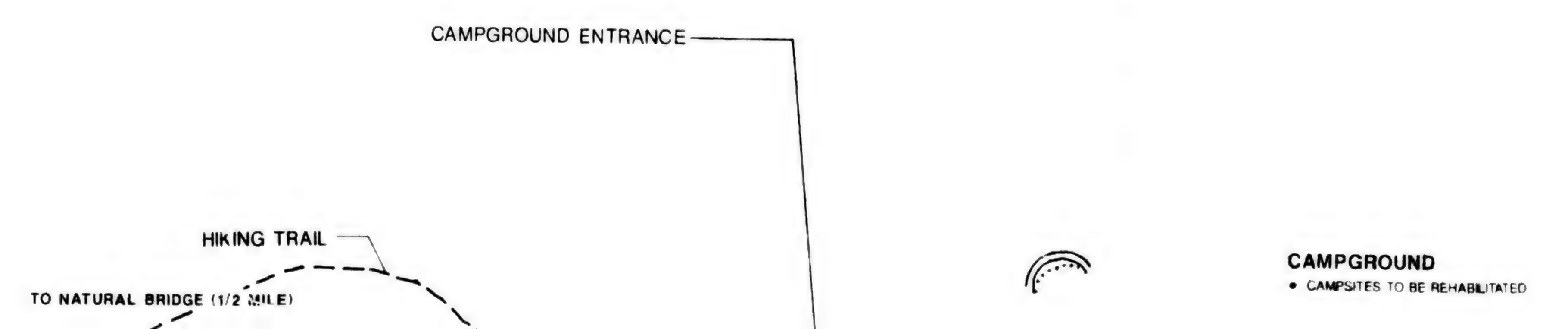

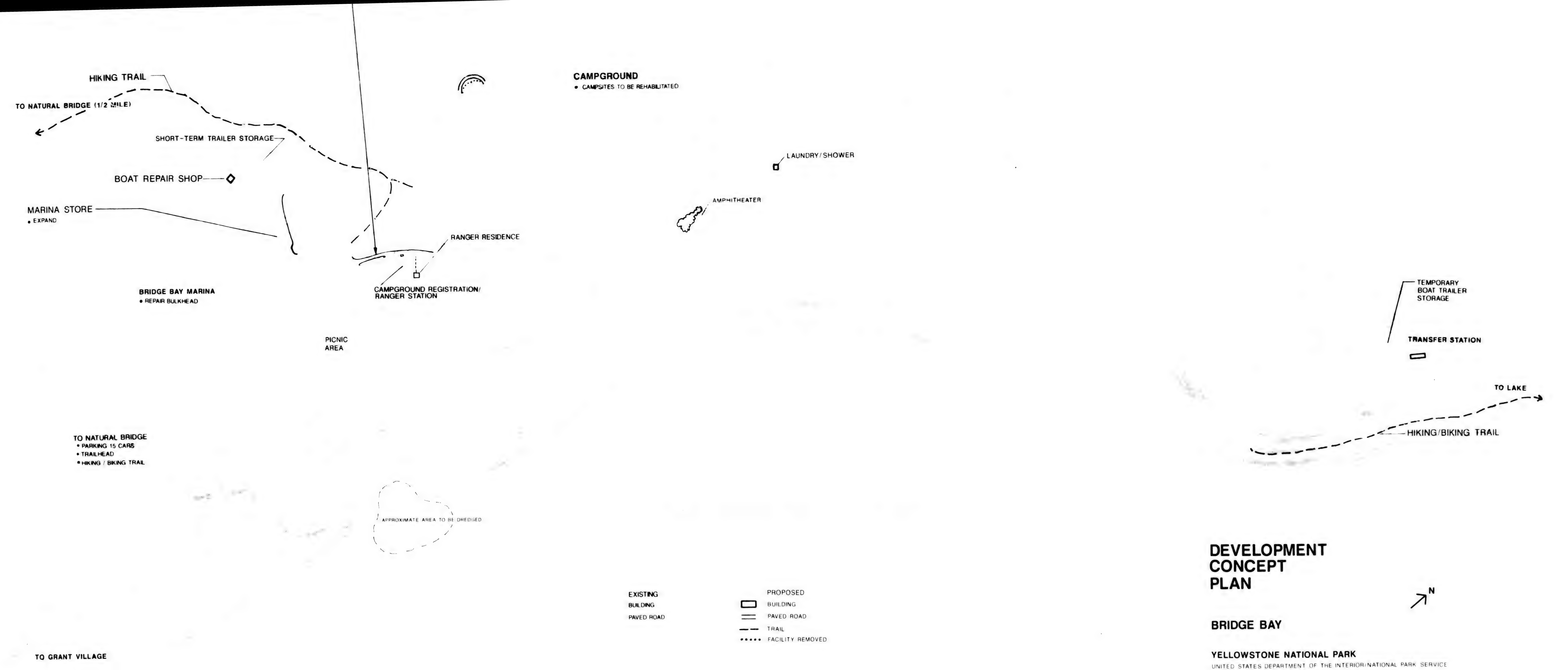

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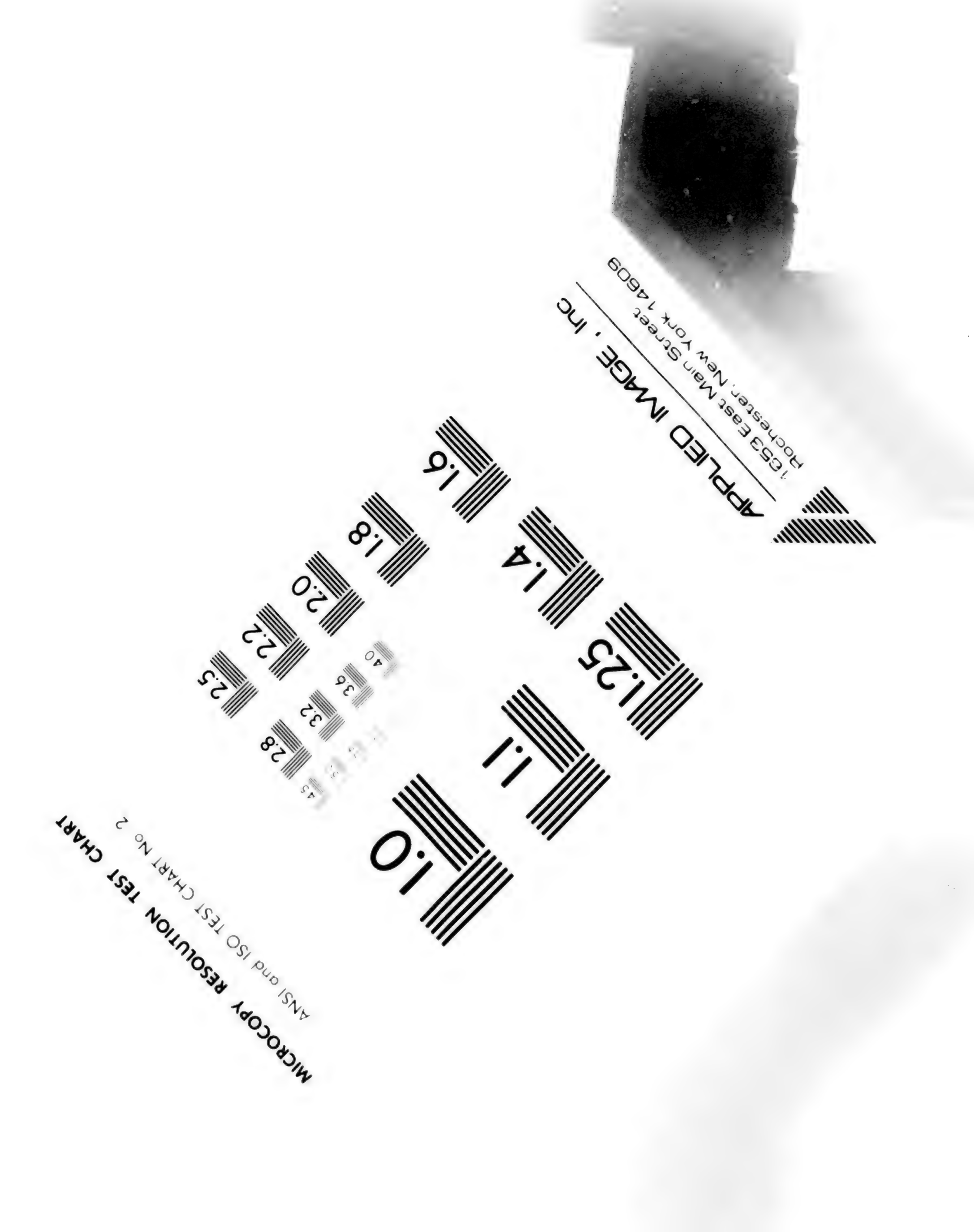

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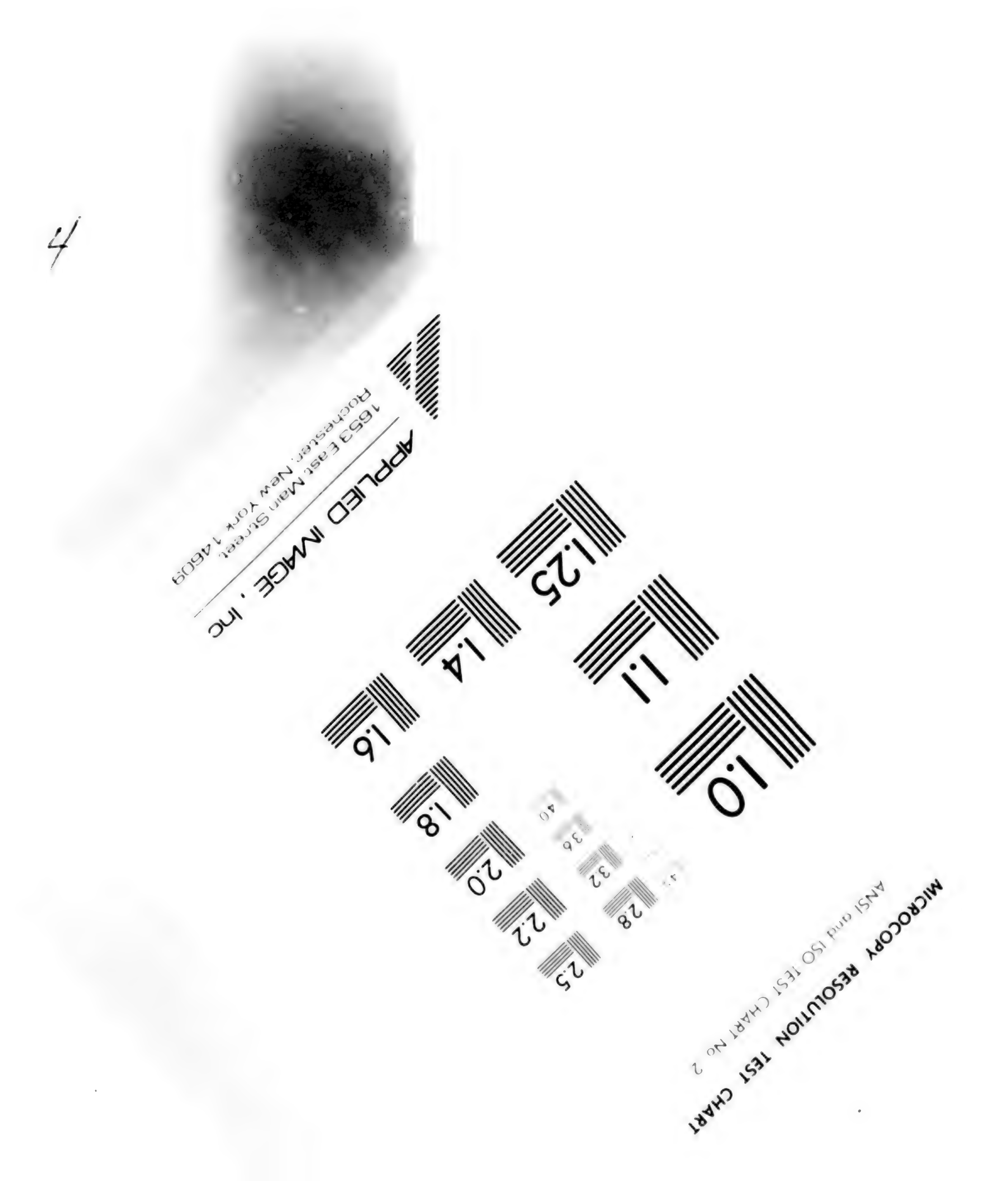

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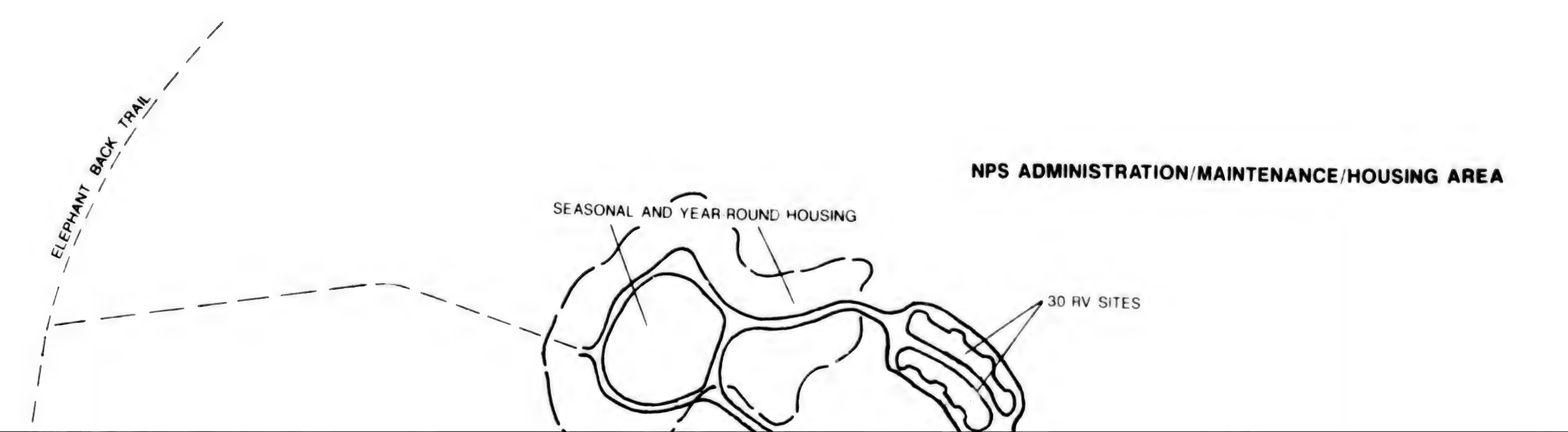
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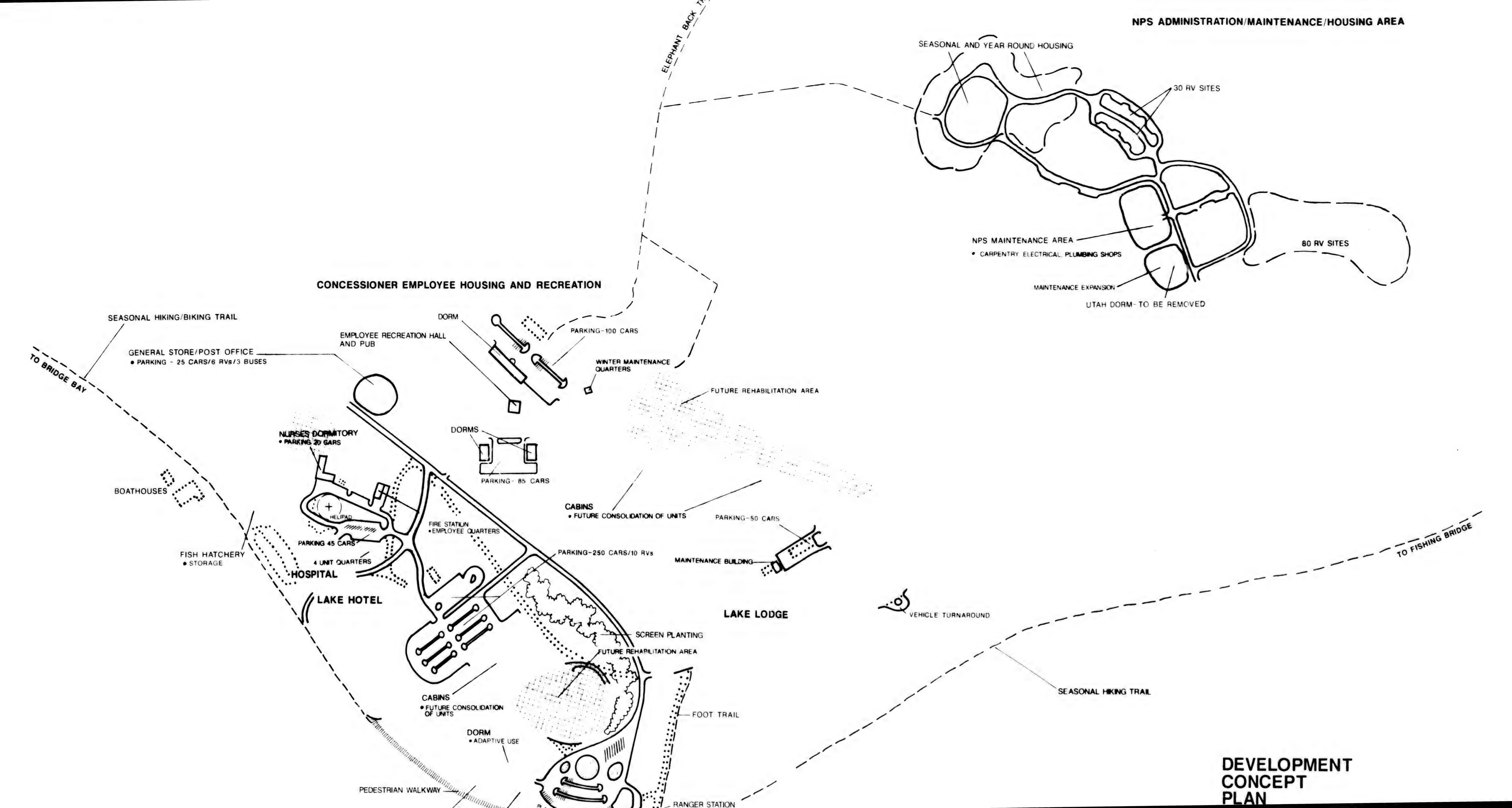

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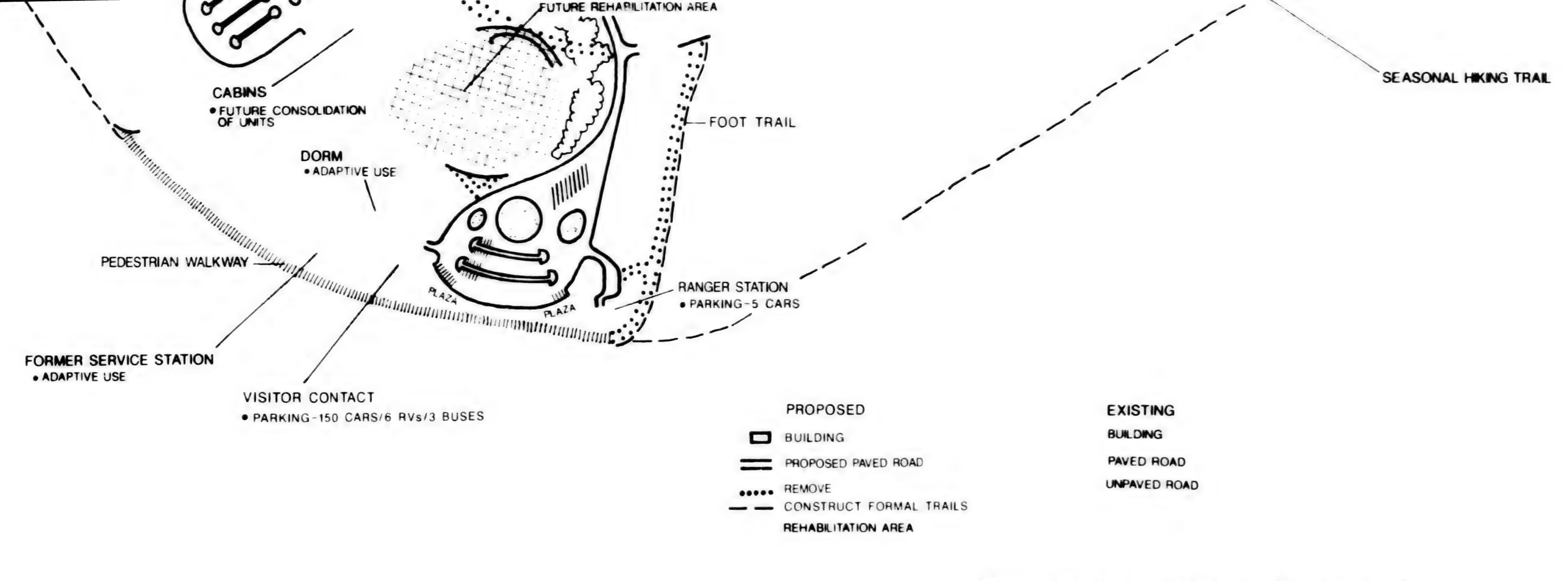

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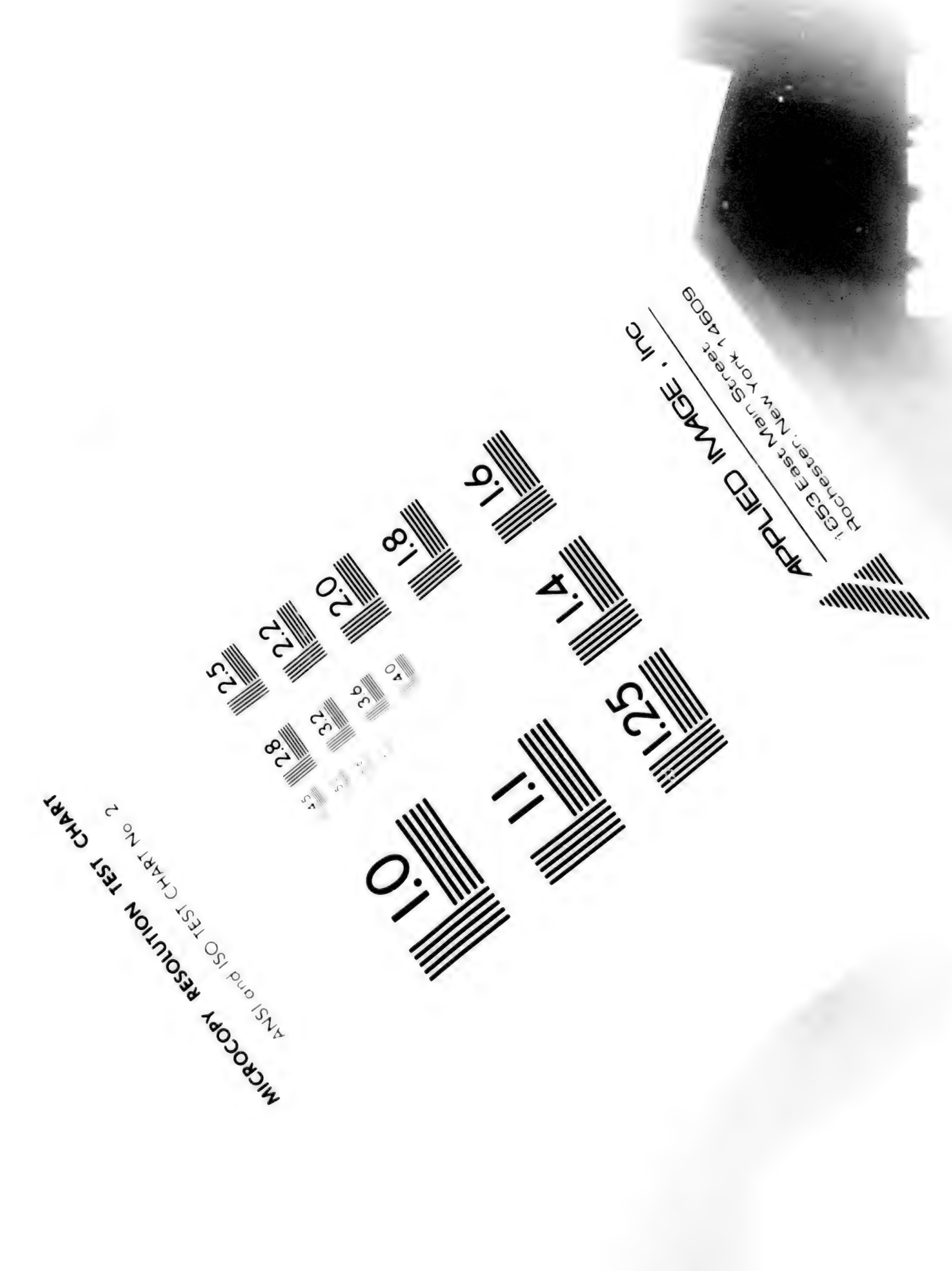

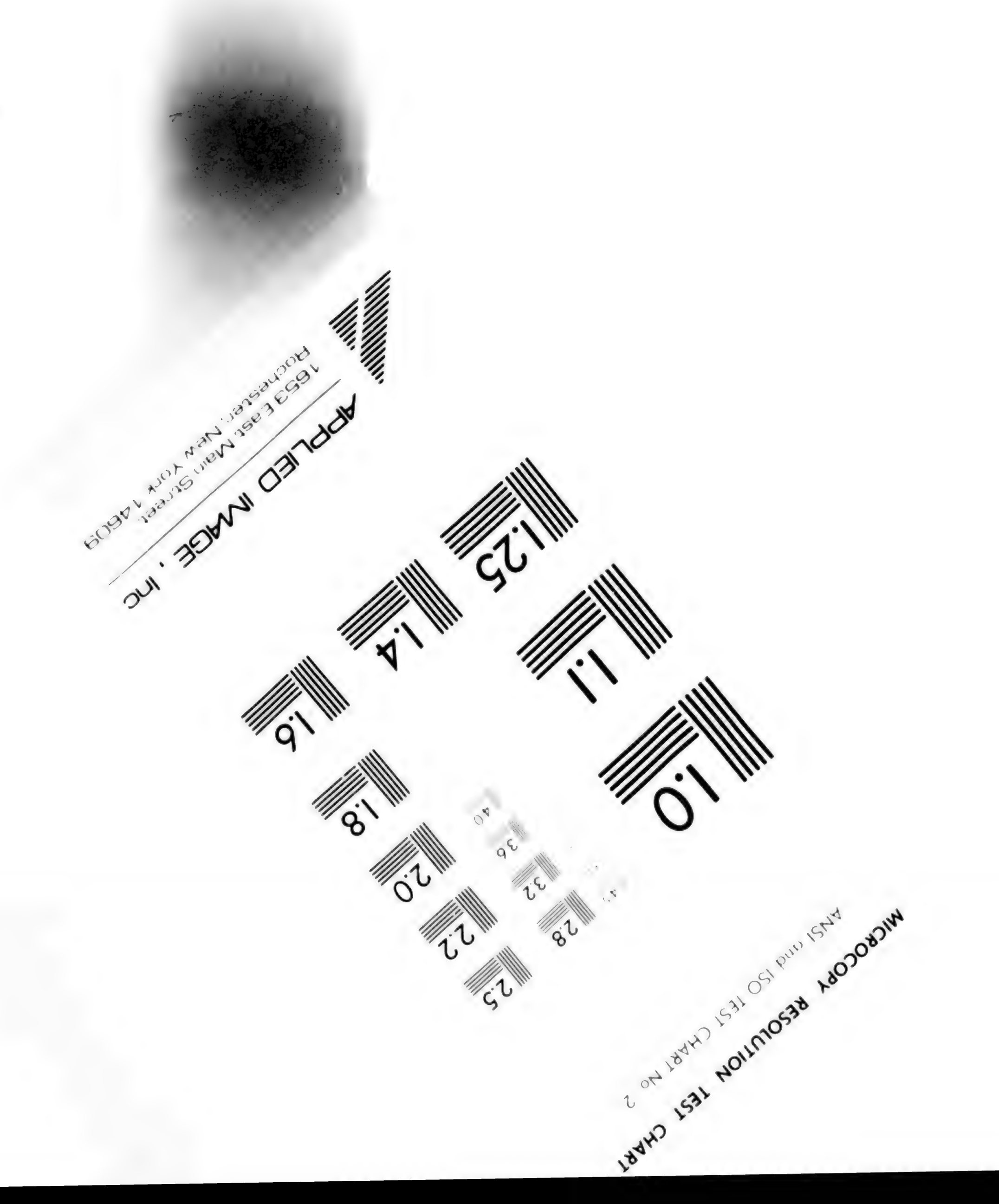

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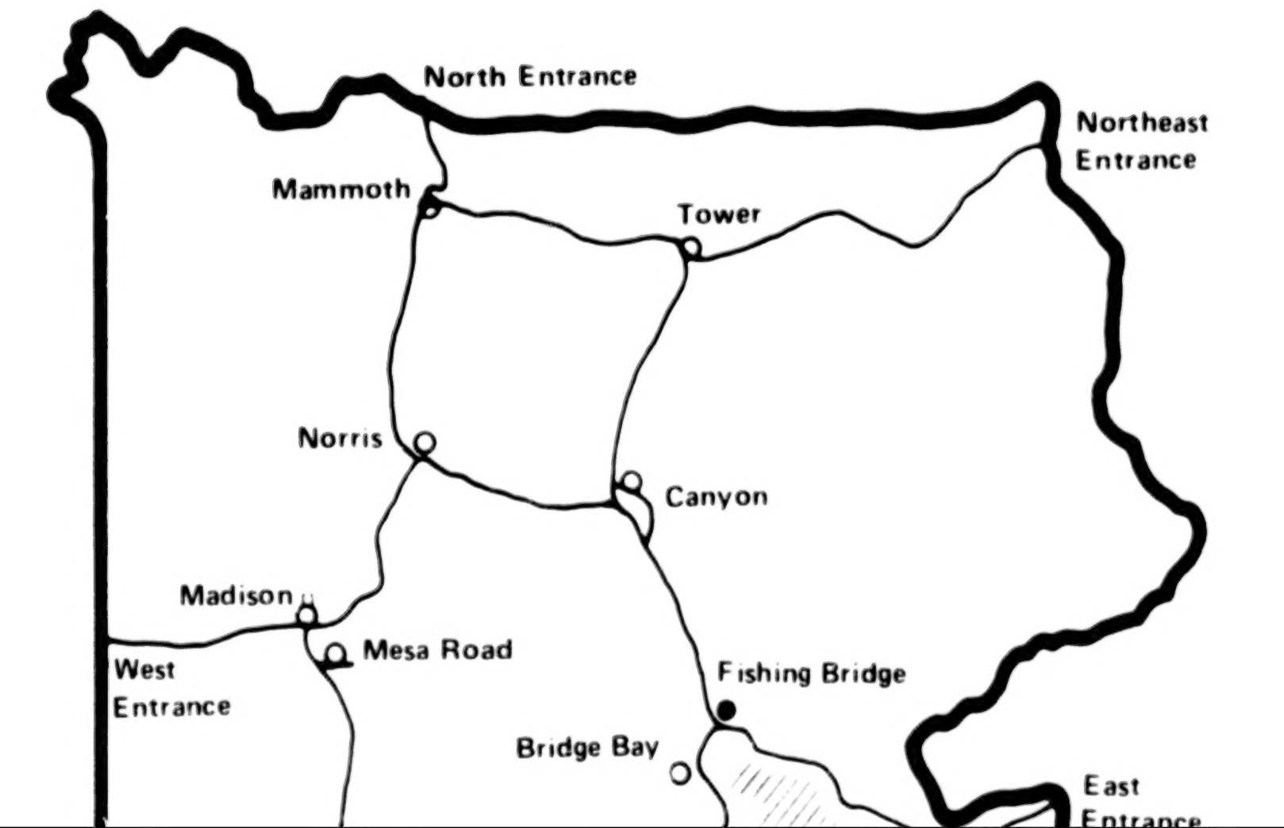

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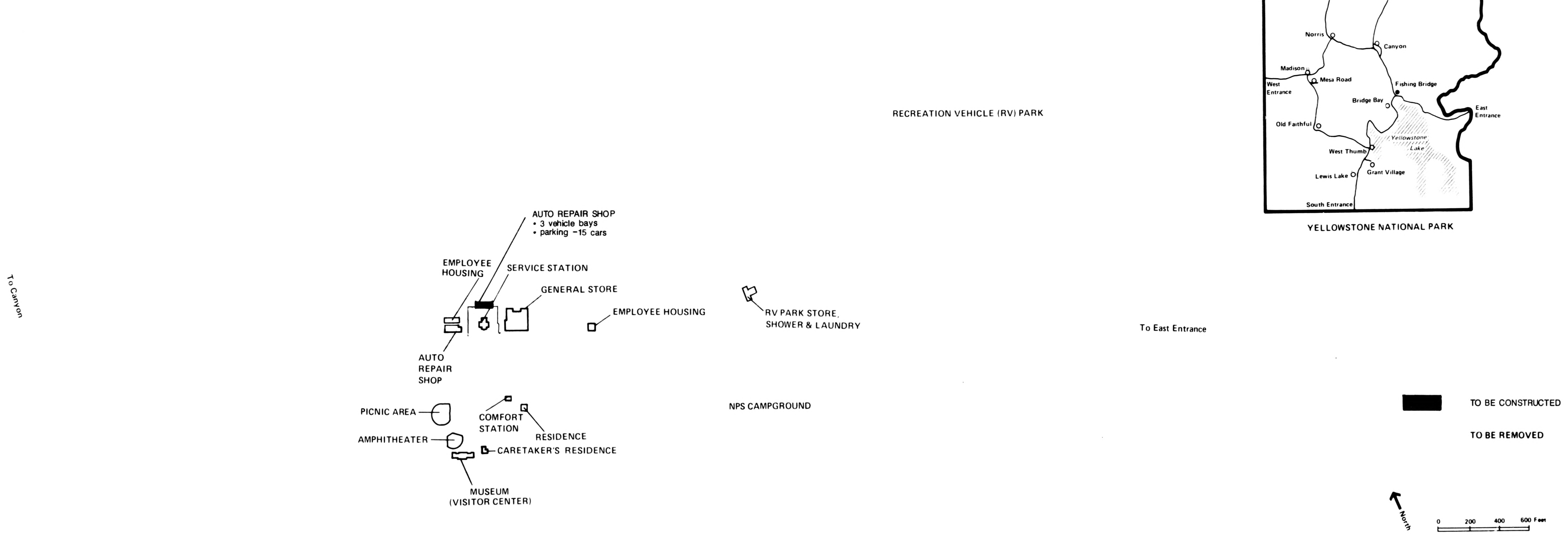

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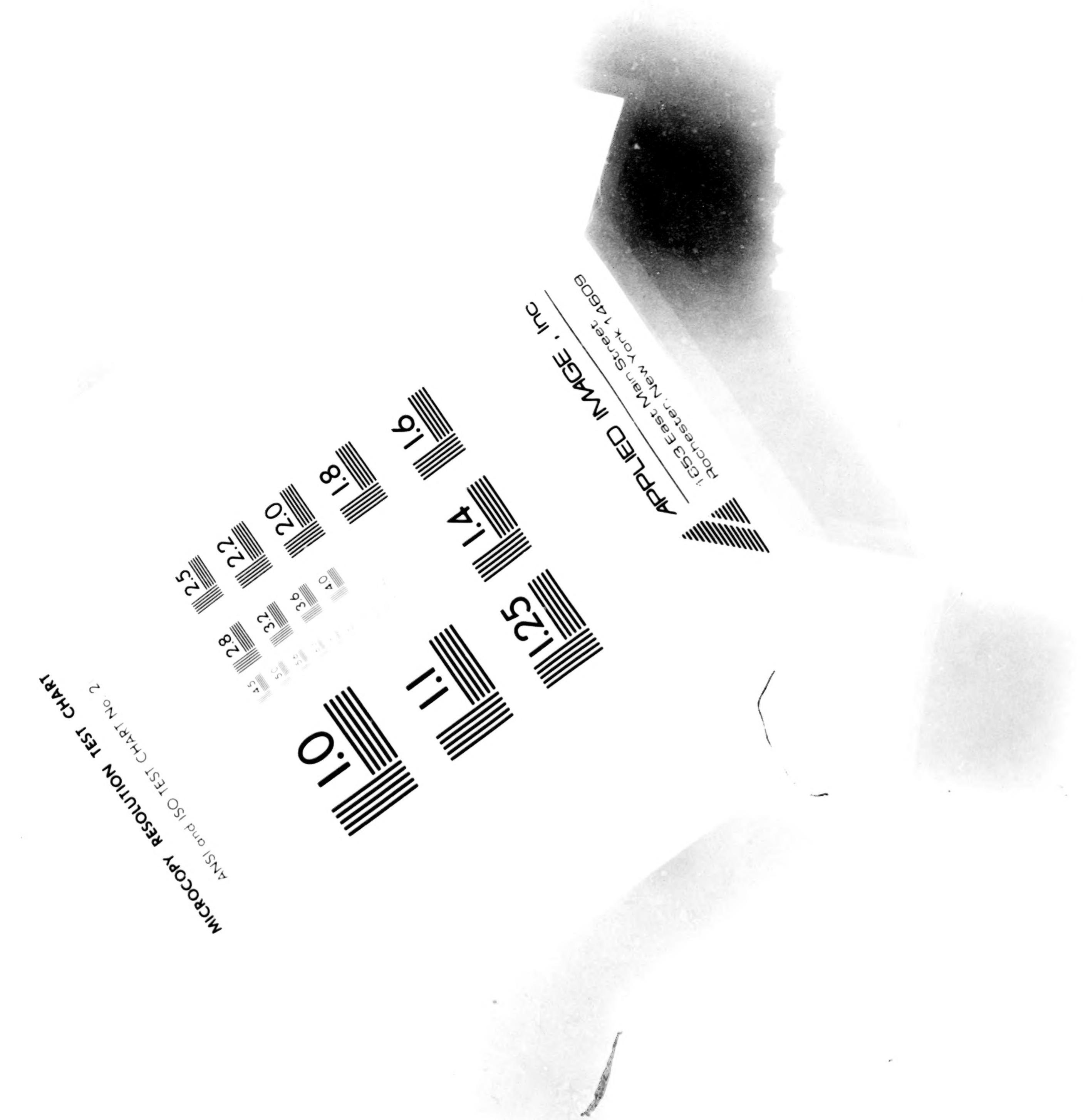

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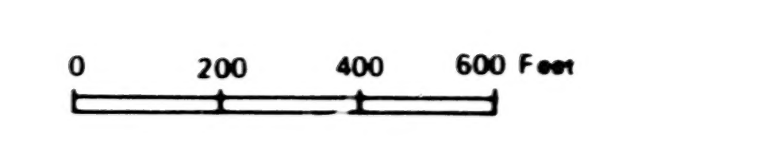

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